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TYPES OF OEDEMA CASES SEEN IN A RURAL AREA IN BENGAL

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Recently cases of œdema have been reported from several quarters in Bengal and their number is stated to be gradually increasing. The clinical phenomenon of œdema, particularly of the extremities, occurring in a number of individuals or families at a time in any part of Bengal is generally caused by "epidemic dropsy". The general tendency of the public as well as of the medical practitioners, therefore, is to attribute such cases to this disease. In normal times it may be rightly so in most cases, particularly when such incidence occur simultaneously in a group of population in a particular locality, but in view of the experience gained during the recent Bengal famine and the after-effects still prevailing in the country, the possibility of such cases arising out of nutritional deficiencies cannot be altogether ignored. These cases therefore need investigation. Opportunities were made available to us to study a few of these cases which occurred in a village named Paltagarh under the Singur Health Centre in the district of Hooghly, Bengal by Dr. J. B. Grant, M.D., C.B.E., the then Director of the All-India Institute of Hygiene and Public Health. The purpose of this short note is to present our findings regarding the cause of such œdema cases at Paltagarh as well as to indicate the methods adopted for the investigation.

METHOD

The investigation was carried out in stages in the order mentioned below:—

(1) Ascertainment visit,

(2) Diagnostic visit consisting of filling up of schedules, physical examination and examination of clinical materials *e.g.*, stool, urine, blood and samples of mustard oil etc.

(3) Treatment and advisory.

(4) Economic survey.

(5) Dietary survey by the diary method.

The following is the list of schedules used during the investigation. (The specimen copies could not be given owing to want of space).

(1) General individual schedule.

(2) Clinical score card schedule (Nutritional assessment card with key).

(3) Economic survey schedule.

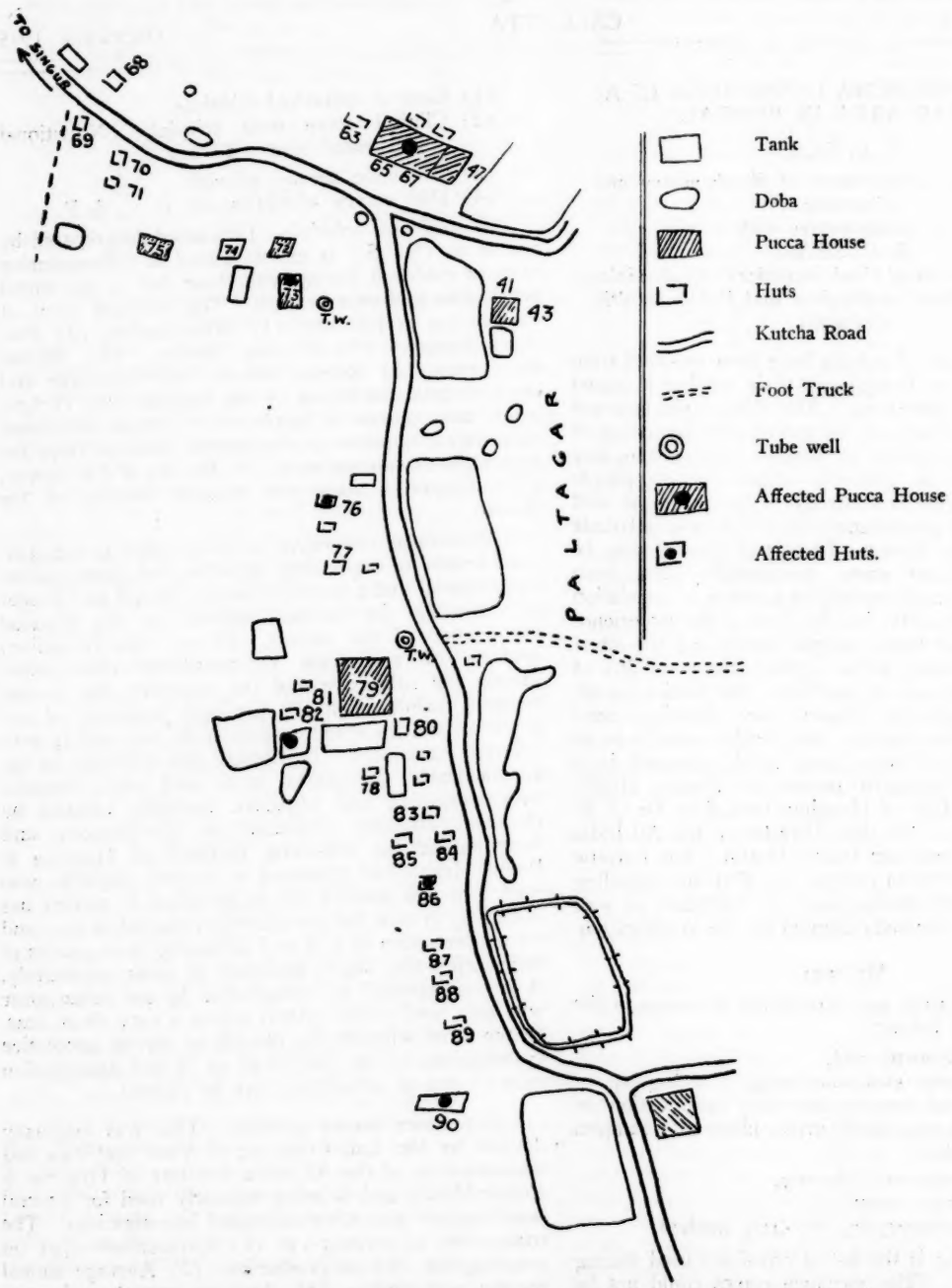
(4) Diet survey schedules—A. B. C. & D.

General case schedule—This schedule prepared by one of us (S.C.S.) is mainly aimed at differentiating cases of epidemic dropsy with those due to nutritional deficiencies and other causes. The principal items of enquiry are as follows:—(1) Identification, (2) Previous history, (3) Present history, (4) Recent movements, (5) Recent visitors, (6) Economic and environmental conditions of the families, (7) Dietetic habits and sources of supply, (8) Clinical nutritional deficiencies, summary of the records obtained from the nutritional assessment card, (9) Results of diet survey, (10) Enquiries about the possible sources of the disease.

Nutritional assessment card—In order to maintain a uniformity of expression regarding the abnormalities it is essential that a standard method should be followed in recording the various features in the physical examination of the patient. Of the two recognised methods of assessment of nutritional deficiencies, namely the subjective and the objective, the former depends mainly upon the personal judgment of the physician and the results are likely to vary widely with different examiners. To obviate this difficulty as far as practicable, the clinical score card which includes both subjective and objective methods adopted by Dr. G. Sankaran, Professor of Biochemistry and Nutrition of the All-India Institute of Hygiene & Public Health and employed in various enquiries was used. In this method the examination is carried out system by system, the normality is recorded as zero and the abnormalities as 1, 2 or 3 indicating three grades of deficiencies, *viz.*, slight, moderate or gross respectively. A key is provided for consultation by the investigator who gets used to the system within a very short time. In the same schedule the records of several successive eyaminations of one individual or of one examination each of several individuals may be entered.

Economics survey schedule—This was originally devised by Dr. Lal, Professor of Vital Statistics and Epidemiology of the All-India Institute of Hygiene & Public Health and is being regularly used for general health survey and other associated investigations. The main items of enquiry are (1) Expenditure—(*a*) on consumption, (*b*) on production; (2) Average annual income per capita; (3) Average annual saving or deficit per capita; (5) Index of prosperity.

The index of prosperity is determined by the assessment of two factors namely, (1) economic status based on per capita consumption level and (2) economic stability. Therefore, in calculating the index, the families are at first classified into three groups depending upon their *per capita* expenditure on consumption side only. Each of these groups is again classified under five sub-divisions according to the economic stability of the families assessed on the percentage of the annual saving or deficits over the total income. The annual saving or deficit is the difference between the *per capita* total income and the *per capita* total expenditure.



SKETCH MAP SHOWING THE DISTRIBUTION OF OEDEMA CASES IN THE AFFECTED AREA OF PALTAGARH

The classification of the sub-groups are based on the following criteria:—

A = Saving above 15%
B = Saving between 5 to 15%
C = Saving or deficit 5%
D = Deficit between 5 to 15%
E = Deficit above 15%.

This schedule has been found to be very useful in assessing the family's economic conditions which have direct or indirect bearing on the health conditions of the family. Another great advantage claimed is that it carefully obviates the effects of inflation or depression of the economic status of the country or locality as a whole.

Diet Survey Schedules—There are mainly three methods for carrying out a diet survey namely, (1) weighing method, (2) diary method, (3) questionnaire method. The relative values of these methods have been discussed in the Bulletin of Health organisation, League of Nations, 1937. The 'diary' method was followed in this investigation. The schedule is prepared in four sections namely, (*a*) Requirement of proximate principles and accessory food factors of the family by individuals, (*b*) Food account, (*c*) Daily consumption of the proximate principles and accessory food factors by the family, (*d*) Report relating to adequacy or deficiency.

The accounting of food in the 'diary' method consists in obtaining a record of the quantity of various foods taken during a period of seven days from which the average daily consumption of the family is calculated. On the morning of the first day a careful inventory of the foods in stock including the new purchases for the day is made. Then a complete account of all the food-purchases day to day for the next six days is entered in the schedule in the "gain" column. Simultaneously the daily wastage *i.e.*, foods not consumed by the family members *e.g.* foods consumed by visitors or the portion thrown away or given away to beggars, cattle etc. are recorded in the "loss" column. At the end of seven days another inventory is made of the stock left over in the house. Then the net consumption of the family is calculated as given in the schedule.

The actual quantities of different foods consumed are then transferred to schedule (C) and the food values in terms of the proximate principles and accessory factors are calculated according to the recommendations of Bengal Nutrition Committee. In Schedule (A) the physiological requirements of the family members are calculated according to the same recommendations. The findings of the above two schedules are then summarised in schedule (4) to evaluate the adequacy or otherwise of the different food principles required by the family.

Results of Investigation

Information reached the Singur Health Centre on 24-11-44 to the effect that several œdema cases had occurred in a particular locality of the village Paltagar and one of us (P.C.S.) visited the area on the same day. The distribution of the cases was as shown in the sketch map. (See opposite page).

It wil be found that the cases were distributed in the houses along the road side in close proximity to one another.

Clinical Findings

A summary of the clinical and epidemiological records of œdema has been given in Table I. The first 5 cases described in the table gave history of onset with œdema of the ankle and feet associated with or without diarrhœa and followed by palpitation of heart. In certain cases this œdema was followed by reddish flush and burning sensation over the extremities almost characteristic of epidemic dropsy. All of them had solid type of œdema pitting on pressure. Heart was found enlarged in three cases and the knee jerk was brisk in all except one (Case 5) in whom the response was diminished. The sensations were normal in all and ocular tension was slightly increased in one case.

The next four cases gave a very vague history of onset, œdema having noticed irregularly, first either on face or extremities or both, at varying intervals, usually following other clinical conditions such as, fever, dysentery, uterine hæmorrhage, etc. Oedema was of solid type pitting on pressure in two of the cases, the history of occasional diarrhœa was present in three, tongue was ulcerated and fissured in all, knee jerk was exaggerated in one and absent or diminished in three, ocular tension normal in all, and severe anæmia was present in three cases. Heart was irregular in three of them with enlargement in one and adventitious sounds in others. Case No. 7 was suffering from slow fever and uterine hæmorrhage leading to severe anæmia, generalised œdema, occasional diarrhœa with ulcerated tongue and loss of appetite, enlarged and irregular heart for the past six months.

Nutritional Assessment Results—The results of the clinical assessment of the nutritional conditions at the time of investigation have been summarised in Table II.

TABLE II

Table II—Showing the Summary of the Clinical Nutritional Deficiencies of Oedema Cases.

Case No.	*Vit. A.*	*Vit. B_1*	*Vit. B_2*	*Vit. B_4*	*Vit. C.*	*Vit. D.*	*Fe.*
1	0	0	0	0	0	0	0
2	0	0	0	0	1	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	3	0	0	0	1	2*	0
6	1	2	2	2	0	0	0
7	2	2	2	2	2	0	3
8	1	0	1	0	0	0	0
9	1	0	0	0	0	0	0

* Evidence of past rickets.
0=Normal; 1=Slight; 2=Moderate; 3=gross.

It will be noticed that the first four cases showed practically no clinical nutritional deficiency. Case No. 5 showed evidence of gross deficiency in vitamin A with "Bittot's spot" in his eyes and discolouration. He had also bony deformities of the chest showing evidence of past rickets. Case No. 6 had manifestations of moderate deficiency of B_1 and B_2 and case No. 7 of all the vitamins except D. Case 8 had slight deficiency of

TABLE I—SHOWING THE HISTORIES AND CLINICAL FINDINGS OF OEDEMA CASES AT PALTAGARH.

No.	Name and occupation	Age, Sex and Religion.	Head of the family with total No. of members.	Family No. and composition.	Previous history of oedema.	Date of first symptom.	Onset.	Date of examination.	Signs and symptoms.	Recent movement.	Recent visitors.	Duration of illness.	Dietetic habits.	Sources of food supply. Rice	Sources of food supply. Mustard oil.
1	S.B. (house-wife)	H.F. 55	G.B. A=5, C=3 Total=8	1	Vague	1.11.44	Diarrhœa followed by œdema of foot & palpitation.	2.12.44	Oedema of extremities with burning sensation and pitting on pressure, occasional diarrhœic motion, palpitation on slight exertion, Heart enlarged, P/R=84/18, hacking cough, knee-jerk brisk. ocular tension slightly increased.	Nil	Nil	2 months.	Vegetarian	Parboiled from Calcutta Office and local purchase.	From Cal. office.
2	T.D. (house-wife)	H.F.	do.	1	Nil	15.11.44	do.	do.	Oedema of ankle & feet with reddish flush and slightly pitting on pressure, diarrhœa with gargling, occasional palpitation exaggerated on exertion (one day fell unconscious after sudden exertion). Heart enlarged, P/R=100/20, Knee-jerk brisk.	Nil	Nil	1½ months.	Mainly vegetarian and occasionally fish.	do.	do.
3	B.B. (Bank)	H.M. 27	J.B. A=5, C=3 Total=8	2	Nil	10.11.44	Oedema of feet & ankle	3.12.44	Oedema of the feet with burning sensation pitting on pressure, Heart normal, P/R=80/18, Knee-jerk-brisk.	Visits Calcutta daily.	Nil	5 wks.	do.	Parboiled from Control shop since last one month, local purchase.	From Cal. 5 to 10 lbs. at a time. But not since last one month.
4	T.B. (At home)	H.M. 15	do.	2	Nil	13.11.44	Heaviness & swelling of legs towards evening.	2.12.44	Oedema of lower extremities, face slightly puffy, P/R=84/18, Knee-jerk brisk.	Nil	Nil	5 wks.	do.	do.	do.
5	M.B. (Student)	H.M. 11	do.	2	Nil	15.11.44	Oedema of feet.	do.	Oedema of extremities with irritation and pain over legs with reddish flush, gargling and soft motions. Heart enlarged, muffled 1st sound, temp. 99°F, P/R=96/20, Chest pigeon breast. Knee-jerk diminished.	Nil	Nil	8 wks.	do.	do.	do.
6	S.D. (House-wife)	H.F. 45	T.D. A=3, C=3	3	Similar oedema	28. 9.44	Ankle swollen.	3.12.44	Swollen extremi-	Nil	Nil	4 months.	Mainly vege-	Parboiled	5 to 10 oz. at

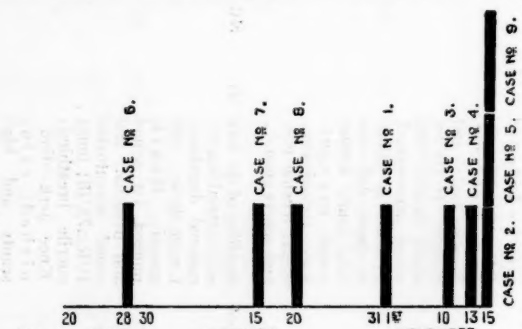
									Knee - jerk - diminished.						
6	S.D. (House-wife)	H.F. 45	T.D. A=3, C=3 Total=6	3	Similar oedema 1 year back.	28. 9.44	Ankle swollen, first more in rt. ankle.	3.12.44	Swollen extremities, eye lids & face; Diarrhœa; Tongue-furrowed and fissured; Heart palpitation on exertion, P/R= 78/18, Knee-jerk exaggerated.	Nil	Nil	4 months.	Mainly vegetarian.	Parboiled rice from own land.	5 to 10 oz. at a time: local purchase.
7	I.D. (At home)	H.F. 50	T.C. A=4, C=1 Total=5	4	Nil	July '44	Uterine hæmorrhage and fever, followed by swelling of legs and other parts; palpitation.	..	Slow fever, extensive œdema all over the body and pits on pressure. Diarrhœa, flabby, pale, fissured tongue appetite lost; Heart enlarged, muffled 1st sound, P/R=100/20; Pulse irregular, low volume and tention; Pain in the lower part of the abdomen and legs; Knee-jerk absent; Ocular tension normal, Urine—large quantity and frequently (normal menopause 5 yrs.).	Nil	Nil	6 months.	Vegetarian.	do.	5 oz. at a time, local purchase.
8	S.D. (cultivator)	H.M. 60	Himself A=6, C=7 Total=13	5	4 or 5 months a year back.	15.10.44	Oedema of face	6.12.44	Swelling almost all over the body and pits on pressure, Teeth - pyorrhœic; Tongue pale and fissured. Heart 1st sound muffled, 2nd sound accentuated, P/R=70/20. Lungs rt. base dull and lung sound feeble; cough present; knee - jerk-absent; ocular tension normal, severe anæmia.	Nil	Nil	2½ months.	do.	do.	1 oz. a day local purchase.
9	M.K. (cultivator)	H.M. 39	P.K. A=9, C=6 Total=15	6	Several times within last 3 years. Last time after an attack of dysentery for 2 months.	15.11.44	Swelling of the face and extremities.	7.12.44	Swelling of the face and extremities, occasional diarrhœa; tongue-flabby and anæmic, Heart-muffled 1st sound and irregular, 2nd sound accentuated P/R=78/18; lungs puerile breathing; Knee - jerk - diminished; urine scanty and high coloured.	Nil	Nil	3½ months.	Mainly vegetarian. Occasionally fish.	Parboiled rice.	10 oz. at a time, local purchase.

A=Adult. C=Children.

vitamins A and B_2 and while case No. 9 had no deficiency except slight of vitamin A.

Other epidemiological findings—Altogether six families were involved. The first two cases are female members (housewives) aged 55 and 33 years respectively of a family consisting of 8 members including 3 children, whereas next three cases (No. 3, 4 and 5), two males and one female, aged 27 and 11 and 15 respectively, belong to another family of 8 members including three children. The rest come from four separate families; Case 6, female, a housewife, aged 45 years comes from a family having 6 members including 3 children; case 7 —a lady, aged 50 years, belongs to a family of 5 members including one child; case No. 8, an old man, aged about 60 years, a cultivator having a family of 13 members containing 7 children; and case 9, also a cultivator, aged 37 years, is a member of the family of 15 including 6 children.

The chronological order of cases as obtained from the history is shown in graph I. As will be noticed



GRAPH SHOWING CHRONOLOGICAL ORDER OF OEDEMA CASES AT PALTAGAR.

the signs and symptoms of cases 1 to 5 were noticed within the first two weeks of November 1944 and the total duration of their illness was spread over 5 to 8 weeks; whereas, the onset of œdema in cases No. 6, 7, 8 and 9 was noted during the last week of October, middle of October and middle of November respectively. The total duration of their illness in order being 4 months, 6 months, 2½ months and 3½ months.

Dietetic habits—Case Nos. 1 and 7 are strictly vegetarian and case No. 6 and 8 are mainly vegetarian, while the rest indulge occasionally in fish and eggs. All of them use parboiled rice, either home produced or locally purchased except families 1 and 2 who bought certain consignments from office ration shops at Calcutta. The latter families, however, got their mustard oil supply in bulks of 5 to 10 lbs. usually from the above sources. Only after the incidence of the œdema cases in their families that they stopped their oil supply from Calcutta. The other four families obtained mustard oil supply locally not more than 5 to 10 oz. at a time.

Laboratory findings—Samples of blood, urine and stool from each case were examined and the results have been noted in table I. Blood was examined for hæmoglobin content and parasites, stools for ova, cysts and protozoa, and urine for albumen, sugar and casts. No case showed any abnormality in urine except case No. 5 who had excess of phosphates. Cases 6, 7, 8 and 9 had hookworm ova in their stools, while no case showed any parasite in the blood, hæmoglobin content was less than 50 per cent in cases 6, 7 and 8 and less than 75 per cent in the rest of the cases. The results are given in Table III.

Testing of Mustard Oil—Old samples of mustard oil were available in families No. 1 and 2 and gave positive reaction for Argemone oil while only fresh samples were available in other families who obtained their supply practically daily in small quantities. One sample from these families and one obtained from the local shopkeeper were doubtfully positive.

Clinical diagnosis—The five cases occurring in the families No. 1 and 2 were diagnosed as cases of epidemic

TABLE III—SHOWING THE RESULTS OF EXAMINATION OF URINE, BLOOD AND STOOL OF CASES AND OF THE AVAILABLE SAMPLES OF MUSTARD OIL

Family No.	*No.*	*Urine*	*Blood hæmoglobin*	*Stool*	*Mustard oil Nitric Acid test*
I	1	Alb. Nil	—75	Ova+Parasites	Positive (Old sample)
	2	do.		Nil	
II	3	do.	—75	do.	
	4	do.	—75	do.	Positive (Old sample)
	5	Phosphate++	—75	do.	
III	6	Alb. Nil	—75	do.	
IV	7	do.	—75	Hookworm++	Negative
V	8	do.	—50	do.	do.
VI	9	do.	—50	do.	do.
				do.	Doubtful

dropsy for the following reasons (*a*) multiple cases in the family (*b*) history of onset and clinical signs and symptoms were typical of epidemic dropsy cases (*c*) history of obtaining mustard oil supply in large bulk, a recovered sample of which gave positive reaction of Argemone oil, the established cause of epidemic dropsy, (d) almost simultaneous occurrence of cases in the families (*e*) no clinical nutritional deficiency was observed in these cases except in the case of a young boy (case No. 5).

The other cases had diverse symptoms and variable onset with other associated pathological conditions including anæmia, presence of hookworm in the stools and evidence of vitamin deficiency (except in case No. 9). The cause of œdema in cases Nos. 6 and 8 appeared to be mainly due to nutritional deficiencies associated with anæmia due to hookworm infestation, whereas the œdema in case No. 7 was caused by severe anæmia due to hæmorrhage together with hookworm infestation and perhaps indirectly by the nutritional

deficiencies. Case No. 9, on the other hand, showed symptoms of slight œdema following prolonged dysentery in association with hookworm infection.

The results of treatment with Vitamin B_1—In order to test the effect of vitamins particularly of B_1 in these cases, 10 mgs. of the latter were administered consecutively for 4 days followed by 5 mgs. for another 3 days to every case with the following results: Some reduction of the intensity of œdema was noted in some of the cases Nos. 1 to 5 but in view of the nature of response given to this treatment by the other cases the effect was not considered appreciable nor specific. On the other hand, cases Nos. 6, 7 and 8 responded well to this drug, by causing considerable reduction in case No. 7 and complete disappearance in the other two cases. The effect on case No. 9 was difficult to judge as he had little signs of œdema when the treatment was started. In order, therefore, to confirm the effect of the drug on cases Nos. 6, 7 and 8, it was withheld till the case No. 7 resumed to her previous condition within a very short time and cases 6 and 8 had slight reappearance of œdema. Instructions were however given to correct the dietetic errors as far as practicable. All cases except case No. 7 finally recovered.

To make the picture complete, economic as well as dietetic surveys of these families were carried out to elicit the possible connections, if any, with the production of the syndrome of œdema.

Economics Survey—The classification into three main groups in the economic status of families, already described, is greatly facilitated if the whole village is taken for the survey. Since the number of families involved in œdema disease was few, advantage was taken of the survey of a larger group of families, numbering in all 50, of the village whose economics survey was carried out simultaneously in connection with nutritional studies of the primary school students at Paltagar and Biramnagar. These families were grouped according to the following three categories of anuual *per capita* consumption level, *viz.*:

Group I	..	Rs. 451/- upwards.
Group II	..	Rs. 251/- to Rs. 450/-.
Group III	..	Upto Rs. 250/-.

The above groupings may appear to be based on unusually high consumption level to a casual reader but this spurious rise is entirely due to the existing inflation of prices of all commodities, the average rise being 275 to 300 percent. The stability was judged according to the criteria discussed before. The six families fall into the following categories as shown in Table IV.

TABLE IV—SHOWING THE DISTRIBUTION OF FAMILIES ACCORDING TO THE INDEX OF PROSPERITY

	A	B	C	D	E
I					
II	..		F2		
III	..	F1, F6		F3, F4	F5

F=Family.

It may be pointed out here that this classification does not correspond to our popular classification, namely, rich, middle (lower and upper) and poor. Here the families have been divided into three strata according to the local condition.

Thus it is found that there was no family in group I, only 1 family in group II and the rest five belong to group III which represents the lowest strata of the village economic level. The family F2 in group II is just at par *i.e.* capable of recovering when slightly disbalanced, whereas the families F1 and F6 in group III are able to withstand slightly greater economic shock. The three other families are worse off and one of them, F5, is beyond recovery.

Results of diet survey—The dietetic differences have been finally calculated on percentage basis for each family and for different food factors to obtain a general view of the picture. The results are given in Table V.

TABLE V—SHOWING THE DEFICIENCIES, IN PERCENTAGE, OF FAMILY DIETARIES AT PALTAGARH

Family No.	*Total calories*	*Protein*		*Fat*	*Carbohydrate*	*Ca.*	*P.*	*Fe.*	*Vitamins*				
		Animal	*Total*						*A*	B_1	B_2	B_4	*C*
I ..	20	43	43	44	30	26	B	E	B	E	73	69	E
II ..	33	80	42	30	35	43	33	E	66	E	46	25	E
III ..	17	70	20	81	E	87	E	E	97	20	90	E	43
IV ..	34	100	54	B	46	86	12	B	95	34	75	B	72
V ..	39	100	45	90	26	66	B	E	25	9	87	B	E
VI ..	E	92	E	65	E	36	E	E	E	E	81	E	E

E=Excess, B=Balanced.

It will be noted that the food is generally deficient in total calories, grossly decient in animal protein, fat and calcium. Even carbohydrates are also deficient in some. Vitamin A is alarmingly in the fourth, families grossly in one and slightly in the fourth, while vitamin B_1 are moderately deficient in two, one of which also shows gross deficiency in vitamin C and moderate deficiencies in other vitamins. Riboflavin is highly deficient in all families except one showing moderate deficiency. Nicotinic acid, on the other hand, is either in excess or balanced except in family No. 1. The only item of food which was not found deficient was iron. The general picture, therefore is one of a community suffering from dietetic deficiency of a fairly serious nature. Considering the families individually, Family No. 1 shows deficiency in vitamin B_2 and B_4 only, in the diet which is also fairly deficient in animal protein and fat. Family No. 2 has gross deficiency in vitamin A and animal protein and moderate deficiency in vitamin B_2, fat, carbohydrate, calcium, and phosphorous. In this family one of the patients had "Bittot's spot" in one of his eyes. The diet in Family No. 3 is very grossly deficient in vitamins A and B_2 and moderately deficient in vitamins B_1 and C and grossly deficient in

fat, animal protein and calcium. Briefly, dietetic deficiency is very high in this family. The family No. 4 is rather worse in regard to the same food factors as famliy No. 3 except in the item of fat which is balanced. The diet of the Family No. 5 has gross deficiency in vitamin B_2, animal protein and fat and fairly high deficiency in calcium, moderate deficiency in Vitamin A and slight deficiency in vitamin B_1. The Family No. 6 is the only one in which deficiency was rather replaced by excess in most of the items. Even so, the diet was deficient in vitamin B_2, animal protein, fat and calcium.

Discussion

In the above investigation the economics and the dietetic surveys and treatment of the cases with vitamin B_1, following the clinical diagnosis yielded interesting results which have been summarised in Table VI for purposes of discussion. The most important findings is the prevalence of a fairly high degree of deficiencies in the dietaries of most of the families affected at Paltagar. Peculiarly the deficiencies were particularly marked in the families Nos. 6, 7 and 8 belonging to subgroup D or E of group III economic level. This correspondence is remarkable, though expected. The absence of gross vitamin deficiencies in 4 of the 5 cases in families No. 1 and 2 diagnosed as epidemic dropsy although complimentary to the diagnosis, the latter would not have been changed if the findings regarding vitamin deficiencies were otherwise. The nutritional deficiencies would then be an accelerating cause for the œdema as actually happened in case No. 5, who took the longest period amongst the cases

Table VI—Showing the summary of the findings

Family No.	*Case No.*	*Clinical Nutritional Deficiencies*	*Clinical diagnosis*	*Laboratory tests*	*Response to* Vit. B_1	*Index of prosperity*	*Dietetic deficiencies* *Vitamin*	*Others*	*Remarks*
1	1	Nil	Epidemic dropsy	Mustard oil+	No.	III/B	B_2+++	++	
	2	Vit. C?	do.	do.	No.		B_1++		
	3	Nil	do.	do.	No.		A++		
2	4	Nil	do.	do.	No.	II/C	B_2++	++	
	5	Vit. A++ Vit. C?	do.	do.	No.		B_1+		
3	6	Vit. A+ Vit. B_1++ Vit. B_2++	Nutritional oedema with hookworm	Hookworm++	Yes Marked	III/D	A++++ B_1+ B_2+++ C++	+++	
4	7	Vit. A+++ Vit. B_1+++ Vit. B_2+++ Vit. C+++	Oedema following severe hæmorrhage & nutritional deficiencies.	Hookworm++ Anæmia++	Yes Fair	III/D	A+++ B_1++ B_2+++ C+++	+++	
5	8	Vit. A+ Vit. B_2+	Nutritional oedema with hookworm	Hookworm++	Yes Marked	III/E	A++ B_1+ B_2+++	+++	
6	9	Vit. A+	Oedema following secondary anæmia and chronic dysentery	do.	Doubtful	III/B	B_2+	++ +	

diagnosed as epidemic dropsy for recovery (*vide* Table I).

The clinical trial of vitamin B_1 in large doses had practically no effect amongst the epidemic dropsy cases, thus further suggesting that they were not primarily cases of nutritional deficiencies particularly of vitamin B_1 causing beri-beri. On the other hand, cases Nos. 6, 7 and 8 showed evidence of nutritional deficiencies including those of vitamin B_1 both clinically and in their diets. It may therefore be concluded that these cases were suffering from nutritional œdema brought about particularly by protein and vitamin B_1 deficiencies. In case No. 7 however it was further precipitated by severe clinical condition due to uterine hæmorrhage. All of them also responded well to the administration of vitamin B_1. Oedema in case No. 9, which was slight at the time of contact, might have been mainly a post-dysenteric condition associated with hookworm anæmia.

Summary

1. Nine cases of œdema were investigated at Paltagarh in December 1944, of which 5 were clinically diagnosed as epidemic dropsy, 3 cases were due to or associated with nutritional deficiencies and 1 case was from post-dysenteric condition.

(*Continued at foot of Col. 1, page 76*)

INFANT MORTALITY

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Introduction

Infant mortality forms one of the greatest blot of Public Health administration in India. Infants die by millions. Of the 1000 babies born, 162 babies die every year, and an investigation into the causation of infant mortality will therefore be both instructive and interesting. Here the author presents an analysis of infant deaths in 1007 deliveries in Queen Mary's Hospital, Lucknow.

Between 1932 and 1937, 577 male and 510 female babies were delivered. Out of these, 167 infants were either born dead or were destroyed by destructive operations. Out of 920 live births, 89 died before leaving the hospital. The infant mortality within the period of 10 days' stay in the hospital is 93·48 per 1000 live births. Out of 256 deaths of infant 141 were male and 115 were female. There is appreciable difference between the deaths of male and female infants. More males have lost their lives giving a comprehensive ratio of 122·6 males to 100 females. The following table gives the data in detail.

Table Showing the Number and Causes of Death in the New-born

Year.	1932	1933	1934	1935	1936	*Total*
No. of deliveries ..	38	185	251	277	366	1087
Macerated ..	2	10	8	10	3	33
Stillborn ..	2	10	17	35	47	111
Craniotomy ..	0	1	4	6	7	18
Monsters ..	0	1	0	0	0	1
Embryotomy ..	0	1	1	2	0	4
Total no. of deaths	4	23	30	53	57	167
% of death on total no. of births ..	10·53	12·43	11·91	19·13	16·96	15·36

According to Balfour (1930) 49 per cent Indian and 22 per cent English infants die before leaving the hospital. In Queen Mary's Hospital the total percentage of death is 24·39. This compared to Balfour's Indian series is less.

It has not been possible to give the detail analysis of all the deaths that have occured from 1932 to 1936 due to many reasons, one of which is the lack of post-mortem facilities and so some of the primary causes of new-born deaths remained obscure. However the details of 74 still-born and infants dying in first ten days, amongst 366 deliveries in the year 1936 will be helpful in arriving at some conclusion.

Death due to Complications of Labour

In a series of 366 deliveries in the year 1936, 59 cases were admitted in this hospital with the membranes ruptured at home, while a large majority of cases came during labour or just a few hours before its onset. In some cases it was not even possible to do the preliminary examination, and a few of them were delivered in *doli* or in corridor before reaching the labour room. These were either seen by untrained *dais* or were brought as normal delivery failed at home. It was not surprising to find in a few cases rags of old dirty clothes, and lot of oil in the vagina or even in the uterus. Malpositions which could otherwise be corrected and would have saved the lives of many infants could not be remedied as the mother was either completely exhausted or the signs of foetal distress were present, and in certain cases no foetal heart sound could even be heard. The attempt to correct the malposition in most cases failed resulting in stillbirth and craniotomy. Proper antenatal work with a system of trained *dais* would considerably decrease the infant mortality. Deaths resulting from birth trauma could not be estimated owing to lack of post-mortem.

Complications of Labour Resulting in Still-Birth and Craniotomy

Cases dying primarily from the complications of labour include three cases of pulseless and prolapsed cord, three cases of hanging foetus—the head in vagina while the body was lying outside, five cases of malpresentation which could not be corrected, and in three cases the mother was admitted while no foetal heart sound could be detected, two cases were state of complete collapse before they reached the hospital.

Thirty fœtal or newborn deaths were due to complications of labour *i.e.* a total of 40·5 per cent of babies died for this cause. The details are as follows:

(A) *Stillbirth*	*i.*	Ruptured membranes and dry labour	5
	ii.	No foetal heart sound ..	4
	iii.	Pulseless and prolapsed cord ..	3
	iv.	Infant hanging	3
	v.	Mal-presentations	5
	vi.	Mother in collapsed state ..	2
			22
(B) *Craniotomy*		Patient with the anterior lip of the cervix oedematous and the bag of membranes bulging	1
		Head too big, membranes ruptured at home; after-coming head not descending	2
		Version failed	1
		Failed forceps	2
		Osteomalacia	1
			7
(C) *Evisceration*		Prolapsed pulseless cord, membrane ruptured at home	1
		Total ..	30

Ante-partum hæmorrage—Accidental hæmorrhage and placenta-prævia accounted for four deaths out of 74 deaths.

Syphilis—Reports of W.R. of only 30 pregnant women who attended the hospital were available, out of which 5 were positive. One infant died of 'certain syphilis' (findings based on post-mortem examination and the mother's blood being positive for W.R.) and another due to 'possible syphilis' as the mother's blood was positive for W.R.

Toxæmia of pregnancy—Only one death occured due to eclampsia.

Maternal Causes

In the present series of 74 deaths of newborn in the year 1936, 8 deaths could be associated with diseases of the pregnancy. It is very difficult to assess how far the undermentioned conditions were responsible for the deaths of newborn.

Name of the disease	*Number of death in infants*
Anæmia of pregnancy	4
Dysentery	1
Diarrhœa	1
B. coli infection	1
Tuberculosis	1
	8

Death due to Foetal Abnormality

One death was due to hydrocephalus with meningocele, and one on account of splenic and liver enlargement.

Prematurity and unknown Causes

Twenty-five cases come under this heading. Some might be due to birth trauma but I am not in a position to find out its frequency and effects as primary cause of death. Research is needed to investigate the causes of prematurity. The general nutritional state of the hospital class of patients was low. It is probable that a deficient diet had an important role. Special study is required to find out the subnutritional state with regards to Vitamins A, B, C, and E.

To state briefly the total number of 74 deaths of the new-born in the year 1936 in the Queen Mary's Hospital are classified as follows:

Complication of labour ..	cases	30	40·5%
Ante-partum hæmorrhage ..	„	4	5·4%
Toxæmias of pregnancy ..	„	1	1·3%
Syphilis	„	2	2·7%
Diseases associated with pregnancy	„	8	10·8%
Foetal states	„	2	2·7%
Injury	„	2	2·7%
Prematurity and unknown causes	„	25	33·9%
		74	100

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2. The diagnosis was confirmed in all cases by laboratory findings, clinical test with vitamin B_1 and dietetic and economics surveys. All the 4 cases other than those of epidemic dropsy were also suffering from hook-worm infection which might have further contributed to the condition.

3. The occurrence of œdema cases by groups may thus have multiple causes, of which nutritional deficiences at the present time are important to be borne in mind besides epidemic dropsy.

4. The method of investigation has been described.

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NASAL FACTORS IN ASTHMA AND ITS TREATMENT*

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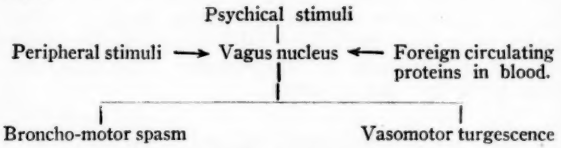
Every known protein contains histidine, and by breaking off a single molecule of carbon dioxide from this we get histamine, which when liberated in the body, gives rise to symptoms of allergy. Our body has a ferment called histaminase, which like adrenalin or ephedrine destroys histamine. Therefore it follows that if our body has deficiency of this ferment (histaminase), we shall not be able to break the histidine of our proteins and thus suffer from allergy. This is also transmitted by either parent, through the chromosomes, and as such, is expected to follow Mendel's Law in children.

Allergy in the respiratory system expresses itself by recurrent catarrhs, vasomotor rhinitis, hay fever and asthma, which may be diagrammatically represented thus:—



From this it is clear that various factors can cause asthma by acting on the nucleus of the vagus nerve. Of these several factors, the present paper only deals with the peripheral stimuli, and that too, to a limited extent. What are these peripheral stimuli which bring about an attack of bronchial asthma? The commonest is the mucosa of the nose and para-nasal sinuses. Others being ocular, gastro-intestinal and uterine disturbances, enlarged bronchial glands, and occasionally stimulation of pleura after pleural effusion.

Though Herk in 1844, a century ago, first suggested that nasal abnormalities may cause asthma, yet the credit must be given to Voltolini who in 1872 cured eleven cases of asthma by removal of ethmoidal polypi. Adam in 1901 brought forward his famous hypothesis that the disease was primarily due to auto-toxaemia which may be intestinal or nasal in origin. Since then the nasal theory has made great strides, so much so that Mathews in 1913 said that 90% of his 300 asthmatics were of nasal origin, though Dundas-Grant in the same year described nose to be the culprit in only 63% of his 107 cases. The climax came in 1919 when Sluder suggested that all cases of bronchial asthma are of reflex origin, the site of reflex being in the upper respiratory tract. Since Sluder the pendulum is rather going in the other direction, especially, when the allergists are trying to outdo both the physician and the rhinologist.

We, the rhinologists believe that toxaemia is a primary etiological factor and that the asthmatic attacks are chiefly flared up by the diseased condition of the nasal mucosa, when the gun-powder *i.e.*, the

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toxins are already circulated in the body. That this observation is substantially true is based on (1) the experimental evidence, (2) the frequency of the pathological conditions present in the nose, (3) the improvement following after the removal of the nasal disease, and (4) recrudescence of the bronchial asthma after the recurrence of the nasal disease.

Dixon stimulated the ethmoid area in decerebrated animals and found spasm of the bronchial muscle. This did not occur if the vagus to the bronchi was previously severed, and returned if the peripheral end of the cut nerve was stimulated. Myers, by mechanical irritation of the ethmoid area, in asthmatic susceptible patients, produced asthma, which was abruptly brought to an end by cocainising the same area and no other. Further he pointed out that when bronchial spasm is brought about in this way, it invariably is localised to the side on which irritation is produced.

Adam called this ethmoid area as 'asthmagenic area' but Haseltine named it 'trigger area'. This is bounded in front by the anterior end of the middle turbinate, behind by the anterior wall of the sphenoidal air sinus, below by the lower margin of the middle turbinate, and above by the cribriform plate of the ethmoid. The corresponding area, of the septum is included in it. To this Adam-Haseltine area, we must add the tips and anterior quarter of the inferior turbinate; and the mucous lining of the antrum of Highmore and the frontal sinus.

With regard to the frequency of the pathological conditions present in the nose, in cases of asthma, we have an overwhelming proof as suggested by the published case reports of Mathews, Dundas-Grant, Myers and others. The general practitioner knows well that the paroxysm of asthma is often preceded or accompanied by, or alternates with, well marked nasal symptoms, such as an attack of sneezes in quick succession, sudden nasal obstruction, acute catarrh and watery nasal discharge. It is also known that this type of asthma is quickly checked when the nasal mucosa is cocainised. In quite a number of cases of asthma which are referred to us, we find one or the other of the following nasal abnormalities. Scattered hypersensitive spots of the nasal mucosa, hypertrophy of the tips of the inferior turbinate, middle turbinate, or the anterior lips of the hiatus semilunaris; ethmoidal polypi, suppuration in the antrum or other para-nasal sinuses. There are also white, greyish-white or bluish-grey patches of the mucosa, seen at one time or other, most frequently on the middle and inferior turbinates and in the corresponding part of the septum.

The histological changes which are found in a very large number of specimens removed from the nose, and para-nasal sinuses of the asthmatic cases, show hyperplasia of the epithelium; œdema with eosinophilic infiltration of the tunica propria; fibrosis with round-cell infiltration in the periosteum, and varying changes from hyperplasia to atrophy in bone. To differentiate allergic from non-allergic cases of sinusitis, one finds the presence of eosinophils in the former and polymorphs in the latter.

In children the nasal pathology does not seem to play the same part as in adults. Bray could only operate on the nose of ten cases out of 800 allergic children. Dundas-Grant, on the other hand, finds that quite half of them have a nasal obstruction either by adenoids or by the anterior end of the middle turbinate. In 20 per cent of my cases the adenoids are the cause of asthma.

Finally for proof, if any be needed, one has seen recrudescence of asthma after the recurrence of the nasal disease which was supposed to have been eradicated by operation.

The treatment of asthma should be conservative *i.e.,* medical and local nasal washes; and when nasal abnormalities are present, surgical. In psychic cases, suggestion plays an important part. Every one of us knows that changes of altitude do them good. This as a rule should be over 3000 feet above the sea-level. Physicians insist on Adam's diet which specially avoids farinaceous food; though Adam later on insisted on getting rid of the nasal factor as well. Peripheral irritation should be avoided including late suppers and cold bed-rooms. In patients with nasal catarrh, simple alkaline douches help to avoid the peripheral irritation. Sensitiveness to foreign proteins could be determined by the skin reactions; and in the absence of these, Young recommends colloidal sulphur and Oriel, proteose injections. Adrenalin and cocaine act by stimulating the sympathetic, whereas belladonna group by paralysing the parasympathetic. Iodides seem to act by activating the thyroid gland, whose secretions lower the thresholds to sympathetic stimulation. How arsenic acts, we do not know at present.

Flandin's method of autoserum inoculation is equally effective in allergic and acute septic infections. But this gives immunity only for that year and should be repeated every year till the actual cause has been eradicated.

It cannot be disputed that intranasal manipulations have resulted in great relief, and cures in a fair number of cases. However there is no agreement as to which procedure is the most effacious, During the Asthma Congres at Mont Dore, the French rhinologists, headed by Halpher and Bourgeois, insisted on operations especially on the obstructed nose. Each case must be treated on its merits, depending on what abnormality is found in the nose. The simplest cases are those in which hypersensitive spots in the nose are present. Tilley's light cauterization of the nose, usually stops paroxysms, by destroying the sensitive mucosa of the nose. This results only in temporary benefit. I usually, after anæsthetizing the nose with 20 per cent percaine, cauterize these spots with trichloracetic acid which results in partial benefit, in that the duration between the attacks is greatly lengthened. If medicinal treatment be simultaneously carried out, the benefits are greater still. If trichloracetic acid is not available, solid silver nitrate fused on silver probe will do.

Inferior turbinate in most cases lies outside the asthmagenic area, but in certain cases its anterior tips certainly starts the reflex. Amputation of this area is approved by some. There is so much division of opinion on this point, that, we may well compare this with the tube in the pelvis, appendix in the abdomen, and tonsil in the throat. I remove the tip of the inferior

turbinate on the following grounds: *Firstly,* if we consider asthma as a vaso-motor neurosis, shock to this system will result in a cure. This shock may be administered to any mucous membrane of the body, and that of the nose is the most accessible. *Secondly,* in psychic cases I remove the tips of these bones as they are easy of access and have no surgical risk attached to it. *Thirdly,* in cases where touching the tips produces a battery of sneezes. *Finally,* whenever I want a further room in the nose for the purpose of washing or gaining access to the antrum. In those who refuse operation injection of sclerosing fluid, containing quinine and urea in the inferior turbinates will no doubt give benefit in a certain number of cases.

Middle turbinate if large and oedematous is usually the source of bad drainage and as such should be removed, only in its most anterior part, so as to avoid the olfactory nerve filaments and the perineural lymphatics. It is best done by making a snip with a pair of scissors and removing it by cold wire snare.

If the anterior lip of the hiatus semilunaris be enlarged, it should be detached with a bistoury and removed by cold wire snare. The object of these three operations is to remove the patholgical nasal tissue away from contact with the septum, by removing as little as possible.

If the Adam-Haseltine area be in contact with the septum above the level of the insertion of the middle turbinate, then it is inadvisable to remove the faulty outer nasal wall, as we are in the danger zone, where the olfactory nerve filaments are surrounded by perineural lymphatics. In these cases it is necessary to do high submucous resection of the nasal septum, so as to give more room in the upper parts of the nostrils between the opposing walls.

Of the paranasal sinus disease, ethmoiditis is the chief one. Voltolini in 1872 cured cases of asthma by removal of the nasal polypi which are the commonest manifestations of ethmoiditis. These should be removed under local anaesthesia by cold wire method. It is too common for these to recur again unless they are removed by the root which invariably detaches the necrotic bony scale from the ethmoid. If they recur again and again, intranasal ethmoid operation should be performed. Hirsch has also shown that in a number of cases the so-called nasal polypi come out of the antrum *via* its natural osteum. If x-ray shows polypoid condition of the antrum, nothing but a Caldwell-Luc operation will cure the patient. On the other hand if pus be found in the nose, its appropriate sources shall have to be found out. In acute cases simple alkaline washes (20 grs. each of Sodi Bicarb and table salt in a pint of water) will usually be found to be sufficient. But if chronic suppuration be present in maxillary, frontal, ethmoidal or sphenoidal sinuses, then one or other of the conservative drainage operations should be performed unless the infection is too severe when a radical operation is indicated. That the sinus, if diseased, must be treated in cases of bronchial asthma, is shown by Mullin in 1926, when he showed that the path of infection from the sinuses is by their lymphatics which partially drain in the bronchial lymph glands.

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CONTROL OF EPIDEMICS IN U. P.

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INTRODUCTORY

Measures for the control of epidemic diseases have varied from time to time according to the concept of the causation of these diseases. In olden times such diseases were regarded as an affliction from the deity, a punishment for sins. The preventives were prayers, incantations, charms and sacrifice of animals, or even of human beings, with which to propitiate the angry God. Even in modern times, eclipses, comets, earthquakes are regarded as warnings of impending pestilences. When theological practices failed to ward off diseases, men naturally sought to avoid or to escape from them. They avoided the sick. Medicine then was not preventive. It was only a healing art.

With the advance of knowledge regarding the causation of disease, preventive measures have undergone a radical change. Progress has been along two distinct lines, public health measures and personal hygiene, both of which must converge, and fall into one line, if maximum results are to accrue. It is obvious that, as is true with any progressive science, we may have to reorientate and modify our present methods of prevention according to the advance made in medical knowledge.

CAUSES OF EPIDEMICS

An infectious disease is caused in an individual by (*i*) the causative organism, (*ii*) the susceptible person, and (*iii*) effective contact between (*i*) and (*ii*) which may or may not be through an intermediary host. Similarly in a community the occurrence of an epidemic depends on (*i*) current pathogenicity of the causative agent, (*ii*) specific immune status of the population, and (*iii*) the degree of dispersal of the pathogen throughout the community.

Examples of increased or decreased virulence of pathogens are to be found in the natural history of several diseases. Scarlet fever has altered in nature from the dreaded fatal disease of 50 years ago. The large prevalence of leprosy from 11th to 14th centuries, of small-pox and typhus in 17th, 18th, and early 19th centuries, and their later fall, cannot be explained except on the basis if cyclical variations in the virulence of the diseases. That preventive measures had no effect whatsoever in bringing about their decline can be surmised from the fact that little was then known about the actual causation of these diseases.

Influenza affords an example of disease how specific immune status of the population prevents the appearance of an epidemic. The disease sweeps over the country like wild fire, attacking almost all, knocking out a certain proportion, but leaving the survivors immune against the disease. With subsequent additions to population by the natural increase, fresh broods of susceptible individuals are added year after year, till a time comes when there is enough material for the conflagration to start again with the

arrival of the required spark. The same thing happens with explosive outbreaks of malaria in non-endemic zones, or with small-pox in areas where vaccinations and revaccinations are not pushed on to the full extent. How compulsory vaccination and revaccination combined with rigid quarantine have banished small-pox from many countries is a triumph of public health regimen over the disease. With the general specific immune status of the population must be considered the question of general nutritional fitness which is an important protecting factor against all diseases. The association of famines with pestilences becomes marked due to general devitalisation of the population. Any general public health programme must therefore, include among its activities the general raising of nutritional standards as an anti-epidemic measure.

With the progress of industrialization, speedy methods of travel and more intimate comingling of large bodies of population, the chances of dispersal of pathogens become great. Spread of diseases like malaria among the workers on irrigation projects, like dysenteries and typhoid among aggregations of tropical labour, like cholera in fairs, affords examples of transmission of disease through spread of infection in a community. Social evils, bad housing, unsafe water supplies, slum conditions, low sanitary conditions, lack of proper education on health matters, all contribute to the provision of necessasy effective contact of the pathogens with susceptible individuals, resulting in prevalence of communicable diseases.

Theoretical Considerations for Methods of Control

Theoretically if we could remove any one of the three factors involved in the causation of infectious diseases, we should be able to control all infectious diseases. For example, if we could somehow kill off causative organisms, or immunise the total population, or prevent contact of the pathogen with the susceptible individuals (which if made through an insect host, would mean eradication of the insect), we should be able to eradicate communicable diseases. In practice, however, all of these are difficult of attainment. In several instances we do not yet know the causative organism, and even when we do know it, it is difficult to eradicate the disease because there may be some carriers of the disease, or there may be endemic zones from where disease may be imported through patients. Similarly immunisation of all persons in a community is not practicable firstly because we have no method of immunisation against several communicable diseases, and secondly because even where medical science has developed reasonably safe and efficient methods, people through want of proper education, do not come forward for protecting themselves against such diseases. Prevention of effective contact with the causative organism again is beset with difficulties due chiefly to lack of education.

Magnitude of the Task

U.P. has a population of 55,020.617 according to the 1941 census. There are 102,833 villages. The number of towns with a population of 10,000 or over is 143. 48,165,349 persons (87·5%) live in villages and 6,855,262 (12·5%) in towns). The annexed statement (*vide* Table) gives the number of death and death rates from cholera, small-pox, plague and fevers for the years 1921 to 1943. The total number of cases of these diseases may be visualised from this statement. Even though these figures, based as they are mostly on the village chowkidar's reports, cannot be treated as absolutely correct figures, they certainly do have a great comparative value. Deaths classified under 'fever' are caused by diseases in which fever is a symptom. It has been computed that about 25% of these deaths are due directly to malaria. From this statement it will be seen that while malaria is the greatest problem, cholera, small-pox and plague continue to take their human toll in spite of great advances in the knowledge of the epidemiology of these diseases. The Province of U. P. is thus a victim to what have been called the Big Four diseases, malaria, cholera, plague and small-pox.

Existing Organisation for Control in U.P.

The Provincial Government has got a public health department under a director assisted by 4 assistant directors on general duty, one assistant director for hygiene publicity, one for malaria and epidemics, a provincial hygiene institute for research and routine investigations, and a public analyst for analysis of foods and drugs. There are 36 M.M.O. H's for 35 municipal towns. There are 48 district medical officers of health, one for each district, assisted by an assistant, each specially trained in public health. There is one S. I. to each of 206 tehsils in the Province. There are school health officers in 13 towns with clinics for the treatment and prevention of diseases in school children. In addition to this, there are 26 public health travelling dispensaries, 16 rural development dispensaries and 40 temporary medical officers appointed off and on for work in epidemic areas. There is one S.I. for 2,12,000 persons in the rural areas. The total expenditure on public health per capita per year comes to Rs. 0·2 (about Rs. -/3/3). It will thus be seen that we have only a skeleton scheme at present working as a fire brigade for putting out epidemic fires when they break out.

For the control of epidemics prompt information of the first case is extremely important. The primary report is made at present by the village chowkidar, who has numerous other duties to perform, has several villages to look after and who is illiterate. He is thus the weakest link in the chain for the control of epidemics. The result is that the district medical officer of health gets information of the disease very late, sometimes when the disease has burnt itself out.

On receipt of information, the D.M.O.H., or his assistant goes to the village, verifies the diagnosis, arranges for disinfection etc., through the sanitary inspector, provides as much medical aid as he can, and immunises the population by inoculation. He has to visit the village several times before he can persuade the village folk to take necessary preventive measures. In England and U.S. the preliminary disinfection and preventive measures are done by the family doctor. Fortunately for those countries they have a system of family physicians. In our own country there are very few doctors practising in villages presumably because there are no amenities procurable in the rural areas.

In the cities, however, the machinery for prompt reporting exists. There are medical practitioners, sanitary inspectors, vaccinators and jamadars, who report cases of infectious diseases to the health authorities. There are legal provisions for prompt reporting. But unfortunately even in cities reporting is not as prompt or as complete as it should be. There are several reasons for this; we have a number of medical practitioners who do not recognise, according to their systems of medicines diseases like typhoid, tuberculosis or diphtheria as such; we have no system of family physicians so that a number of persons go untreated; there is no system for paying the practising physician for reporting the cases as there is in England; in several areas the busy private practitioner has no means to diagnose for want of laboratory facilities. In most European countries, the municipal health departments, provide laboratory facilities to private practitioners. This is almost non-existent here.

These deficiencies apart, there have been some few instances where medical men have not reported cases of notifiable infectious diseases even when they had been provided with printed post cards by the city medical officer of health. Even these few instances should not have occurred in a responsible and well-educated class such as the medical profession is.

TABLE—SHOWING DEATHS FROM CERTAIN DISEASES (1921-43) IN UNITED PROVINCES

Period 1921—43	Cholera		Small-Pox		Plague		Fevers	
	Total Deaths	*Death Rates*	*Total Deaths*	*Death Rates*	*Total Deaths*	*Death Rates*	*Total Deaths*	*Death Rates*
1921	149,667	3·30	1,439	·03	24,009	·53	1,361,920	30·01
1922	2,330	·05	242	·01	23,291	·51	909,293	20·04
1923	8,591	·06	747	·02	74,187	1·63	780,049	17·19
1924	67,000	1·48	2,724	·06	56,210	1·24	947,807	20·89
1925	7,653	·17	9,373	·21	49,091	1·08	875,594	19·30
1926	6,166	·13	12,020	·26	57,297	1·26	867,939	19·13
1927	28,285	·62	7,894	·17	15,570	·34	786,552	17·33
1928	44,941	·99	3,012	·07	80,943	1·78	765,954	16·88
1929	50,924	1·12	11,725	·26	37,678	·83	810,583	17·86
1930	61,334	1·35	11,071	·24	10,860	·24	942,469	20·77
1931	31,118	·64	3,355	·07	31,225	·64	1,025,285	21·81
1932	9,734	·20	2,779	·06	21,697	·44	853,256	17·63
1933	1,915	·04	9,844	·20	9,835	·20	698,173	14·42
1934	31,903	·66	14,817	·31	47,688	·98	970,289	20·04
1935	10,412	·21	26,032	·54	23,019	·47	929,298	19·20
1936	6,793	·14	14,849	·30	7,290	·15	851,847	17·60
1937	6,341	·13	3,200	·07	24,036	·50	792,263	16·37
1938	70,622	1·46	4,411	·09	13,436	·28	940,469	19·43
1939	27,732	·57	10,205	·21	21,662	·45	858,491	17·73
1940	26,099	·54	15,861	·33	11,725	·24	813,622	16·81
1941	52,540	·95	13,161	·24	4,035	·07	802,931	14·54
1942	7,662	·14	4,479	·08	8,953	·16	833,853	14·92
1943	25,705	·45	5,928	·10	7,556	·13	884,071	15·63

LACUNAE IN THE EXISTING METHODS OF CONTROL

Some of these have been indicated above. In brief they are (1) want of organisation for prompt reporting (2) lack of proper education, (3) lack of medical men in rural areas, (4) want of facilities for diagnosis and (5) want of adequate staff. Proposals for post-war planning on public health have been published and some constructive criticisms of the same have already been made by the Provincial Branch of the Indian Medical Association. The problem must be treated in two ways; a short term policy must be pursued to deal with the present conditions and to try to control the number of cases of preventable diseases which may arise; a long term policy should be aimed at producing conditions under which further epidemics would be unlikely.

CONCLUDING REMARKS

In other countries standards of health have been rising steadily during the past two decades. Medicine has become increasingly preventive and protective, and doctors carry their art beyond the cure of disease so that it embraces also the teaching of health and the means of attaining and maintaining it. Men and women are beginning to realise that they can so far order their lives as to enjoy 'health with a polish over it' far beyond their youth. Public health and hygiene today do not mean only control of infectious diseases and supervision of drains. The pendulum is distinctly swinging towards socio-medical aspect of disease. Professor Ryle of London University wants the public to cease thinking of doctors as people to be consulted in times of sickness only, and he would like medical students to be taught more of the foundations, meaning and the measurement of health, and to be afforded more opportunities to examine healthy subjects.

The doctor today 'takes pride in the idea that he is an ambassador of health as well as a healer of disease and devotes, as a rule, both time and care to the inculcation in the minds of his patients of that "will to fitness" which is the necessary foundation of National Strenth'. The 'Science of Public Health' originated from the endeavours of practising physicians. All progressive countries have improved their National Health by the willing cooperation of the medical practitioners and state agencies. It would be for the medical profession to achieve that end in our own province.

A FEW RESULTS OF THE APPLICATION OF SOME NEW AND OLD FORGOTTEN CHEMOTHERAPEUTIC PRINCIPLES

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INTRODUCTION

This is a report of some not completed experimental work. It must be confessed that it is somewhat unorthodox (1) in its angle of approach, (2) in the methods employed, (3) in the theses and hypotheses it went out to test, (4) in the fact that it begs for cooperation, help and advice as how to carry on further investigation, if it can be proved that the work already done is worthwhile supporting. This request is on behalf of the Rural Medical Research Association, Hyderabad-Deccan.

Briefly, the Association is searching for a new and simple type of rural medicine and therapy adaptable to and within the economic means and buying power of the impoverished masses of India. The Association has been forced to adopt the views that:

(1) The terms 'accepted', 'standard', 'proved', etc., as obtained today in official medicine are relative and not absolute.

(2) That the principles of pharmacological research and study of drug dynamics and drugs action may be fundamentally different from those at present adopted in official pharmacology.

(3) That of all branches in our official medicine, pharmacology and therapy are the most ill-developed, unstable, contestable, and not based on any natural or proven law of cure.

(4) Keeping in view the socio-economic misery of India the association agrees with the 58 statements of G Griesslich and Arnold, especially with the statement that

> 'Medicine requires a critical survey of its fundamental principles. Academic science predominates far over medicine and therapy stands back the farthest'.

(5) Also with the four fundamentals of Bakody, the Wolff theses and also with the twenty four theses of Bier, one of which is:

> 'The true meaning of progress must include the past experience of physicians and peoples, a new science, the applied history of therapeutics. It must be created from the sources and not from opinion.'

Concretely, the task of the Association was to find a general antisyphilitic, the chief criterion of which was that it should suit rural conditions of administration, based as Bier said, 'on the past experience of the peoples and physicians' and that it should comply with the general conditions laid down by the Association that:

(1) 100 doses, or more, should not cost more than one rupee, (2) it should be completely stable and non-toxic, (3) be made out of easily available indigenous drugs, (4) be simple in administration and usage, and (5) achieve a reasonable measure of efficiency and therapeutic success. As medical economists, primarily, our contention is that if we are able to achieve 40-60 per cent efficiency of any given standard at 1/100th of its cost, we have contributed materially towards the almost hopeless problem of mass medical aid in India, on the hypothesis that efficiency can, in time, always be increased and cost of production lowered, provided the principles they are built upon are proved correct through practical experiment and experience.

SEARCH FOR AN ANTI-SYPHILITIC

For this purpose the officially accepted approach through the organic arsenicals and massive dosed heavy-metal therapy was abandoned because of its complexity, and a deliberate attempt was made to test out experimental seven fundamental theses which in official pharmacology, have not as yet been properly assayed or even given the serious attention they deserve.

THE SEVEN THESES

1. That heavy metals behave actually as catalysers in pharmacological action and that their role, viewed from this aspect, is of utmost importance. This is based on the fundamental work of Walbum at the Kaiser Wilhelm Academy in Berlin and the Pasteur Institute in Paris, and which, to our knowledge, has not been studied in India at all.

2. Kolmer's statement that 'Massive doses of arsphenamines and mercuric chloride tend to suppress anti-body production and to cause a decrease in the complement: small doses tend to increase the production of agglutinins and augment the complement after a primary decrease.....this is also true of the colloidal metals, calcium, magnesium, arsenic and the arsenical compounds'.

3. Schlossberger and Sollmann's statement that the present reigning therapy of syphilis and pyodermias with massive heavy metals is not always indispensable, if not scientifically incorrect: and that Ehrlich's 'Therapia Sterilisans Magna', though possible in certain types of protozoal infections was neither always possible nor necessary.

4. That the old Ayurvedic and Unani conceptions of chemo-therapy were, if interpreted properly in accord with and vindicated by the trends and results of modern experimental research as stated in items 1, 2, and 3.

5. That while a specific remedy in the narrow sense never has been and never can be, and while no remedy or combination of remedies can cure all cases of any particular designation because of constitutional peculiarities, there can and must be routine remedies for routine conditions, which often help to effect brilliant cures, but generally help more to modify the disease in such manner or to such extent as to enable other appropriate remedies to effect a cure.

6. The Ayurvedic thesis of fundamental importance, that the heavy metals act as catalysers (Rasayan); but that drug action is determined, directed, and modified by the organic part—the herb or animal tissue extract (*anupan*), which is not in the ordinary sense the vehicle but the curative agent. In short, that the metallic catalyser undergoes a vital change in therapeutic action when combined with the herbal or tissue extract. As modern counterparts may be mentioned the works

of Levaditi on arsenic, bismuth and quinine, The Howard-Levaditi-Lepine experiment with bismuth, Kadish's results with tissue extracts, Zieh's studies on splenic hormone as well as those of Kolmer, Kritschewski, Kelly, Feldt, Jungeblut and others.

7. The determination of the Ayurvedic thesis that a basic drug grouping, whose proportions are slightly modified, if brought into combination with other one or more drug groupings of different categories or points of pharmacological attack will, as in bacterial symbiosis (Plehn), materially modify the pharmacological and therapeutic action of the end products. This is in accord with Buergi's synergistic principle of oligo-dynamic action. Thus, given a single basic remedy, in combination with other basic remedies or groups and dissolved in various single or combined vehicles of plant origin, should give a large range of actions, thus yielding a wide range of therapeutic indications for a single basic remedy. The vehicles we have in view are the Ayurvedic conception of the *anupans* and consist of the common and easily available domestic juices such as that of the onion, garlic, betel-leaf, ginger, *tulsi, bhendi, bipli* etc.

Short Substantiation of the Theses

We advance a few evidences from current scientific material to substantiate the seven theses and hypotheses we have experimented upon to justify even the attempt.

Walbum's Thesis—That heavy metals are catalysers and anti-body producers of probably enzymatic character is based on the extensive work of Walbum on the heavy metals. It is possible that in India this valuable work and its wide-reaching conclusions have not been studied as yet. While British text books are proverbially conservative and unprogressive, American pharmacology has not paid it the attention it deserves.

Briefly, the several years of Walbum's work on the heavy metals lead to some important conclusions. His initial work theoretically presumed that anti-toxin forming processes were probably of enzymatic character, that could be stimulated or depressed by certain catalytic agents acting on them. Metal salts were used to stimulate anti-toxin formation. The early work was on the formation of diphtheria anti-toxin and coli-agglutinins, the formation of goat amboceptor, on the lipolytic enzymes of the blood plasma and the anti-bacterial and bactericidal substances in the blood.

A significant fact emerged very early during these experiments. The dosage, concentration or dilution of these salts played a great role, as was noticed several decades before by the pharmacologist Schulz, and it became increasingly apparent that below and above a certain concentration, the action fell in intensity. Thus definite optimal concentration prevailed and each metal had its own optimum figure, as was shown in the anti-streptococcal and anti-staphylococcal action of manganese chloride in rabbits and caesium and irridium in rat in infection in rats. There, in rats, the optimum dose was 0·007 mg. caesium, and it is significant that a dose three times as large, or only one third as small as the optimal dose, was ineffective. So also in experimental tuberculosis of 400 animals, most of the metal salts were ineffective, some prolonged life (gold) and some were very effective, *e.g.* manganese and aluminium. The point of intrinsic importance is the finding in all these cases that *if the dose is large the bacterial growth is stimulated and the animal dies.* The therapeutic dose is such as does not stimulate bacterial growth and the antibody forming and optimal dosage curve lie about the same level. Large doses stimulate the bacteria and kill the host. The same principle has been applied by Helms in human tuberculosis with success in 16 out of 28 cases.

As an example, in animal experiment it was found:

0·0025	mol.	Caesium	..	10%	animals	survived.
0·002	„	„	..	27%	„	„
0·0015	„	„	..	74%	„	„
0·0012	„	„ (Optm. dose)	..	95%	„	„
0·001	„	„	..	87%	„	„
0·0005	„	„	..	22%	„	„

In all such experiments of biological reactions attention must also be paid to other factors than merely th drug and the host: factors such as time, the state of irritability of the tissue, response threshold values, phasic effects and fatigue, specific immunities developing through non-specific stimuli, the alteration of immunity and sensation through previous infections etc. (Hektoen, Conradi, Wilder, Koetschau, Danielopolu, Obermier and Pick, Flechseder, Lohr, Parleveccio, etc.)

Further experiments of Walbum led to conclusive evidence, which is significant for our purpose, namely, that the optimal dose (the most effective) necessary to effect most profound systemic changes or rouse anti-body response lie far below the levels usually employed in pharmacological experiments of the official school of medicine, allopathy.

The second important evidence provided is that every drug, under certain conditions, depending upon the quantity employed (concentration), state of tissue response and its threshold value, the toxic factor, though non-specific in itself may take on the role of antigen and thus produce 'specific' stimuli. The optimum dosage as in the case of rat cancer ranged between the phenomenally high 'dilution' of between 10^{-11} and 10^{-15} and in some cases was as high as 10^{-21}. To quote Walbum:

'The optimal effective dose of silver was usually between 10^{-15} and 10^{-11} molecular solution 0·1 c.c. subcutaneously. Large doses, *e.g.*, 10^{-5} mol. solution, *i.e.* 1/10,000 mg, seem to favour the growth of the tumour and frequently led to rapid death of the animal'. It is not surprising that the homoeopaths have taken advantage of these findings to explain their own theories of drug action and their so-called 'infinitesmal' dosage (Lesser, Raynor, McGavack, Perrson, Wells, Traube).

Summarised, it leads to:

1. The dosage has great significance.
2. There is an optimal dose and concentration, above or below which the action is lowered, delayed or destroyed.
3. The action is directed towards forming or stimulating the formation of anti-bodies.

4. The dosage is far below the official physiological; is incredibly small, and that such small doses may increase the anti-bacterial properties of the organism as proved by animal experiments.

5. That non-specific bodies may, under conditions, create 'specific' reactions and anti-bodies. That each drug may work as an antigen.

6. Large doses tend to favour the parasite and destroy the host.

Kolmer's Thesis—The brief resume of Walbum's fundamental work, given above, will suffice to support Kolmer's statement that large doses of heavy metals tend to destroy the natural defensive mechanism of the body. Precisely the same statement has been made by the League of Nations Committee with regard to quinine. After years of abuse of large doses of quinine it has earnestly been recommended to lower the dose so as not to destroy the natural defensive mechanism of the body, a recommendation that is honoured more in the breach by military authorities in India. The action of none of the heavy metals is known in any detail or with any degree of accuracy, and that too for drugs which in folks' medicine have proved their efficacy for thousands of years. Though the mechanism or hypothetical mode of action of the organical arsenicals has been suggested by Osterlin and Gruenbaum (Reiziss, Reiziss & Severac), and Voegtlin and Smith have suggested that the organic arsenicals are reduced *in vivo* to arsenoxide (Mapharsen), it is neither clear nor convincing, much less final: nor can it be considered the only rational or sole possibility. Nor can the reticulo-endothelial system be considered the only mechanism of anti-body response. The fact that Voegtlin *et al* have suggested the theory that the host is supposed to transform the compound into arsenoxide, detoxicated by the aid of sulphydryl radicals, the glutathione, must suggest at least the possibility, that restriction of attention to only the liver and spleen, bone-marrow and the reticuloendothelial system may be insufficient, and that the skin, where the cystin and cystein inter-play is paramount, may be of fundamental importance as an organ of immunisation. Thus the works of Marzinowski, Orlow and Levinoshn, Roskin, have shown the increased effect of arsenicals after pre-irradiation of the animal's skin. It is clear that the liver and speen have a great role to play (Feldt, Jungeblut, Kelly, Kolmer *et al*, Kritschewski and Meiersohn, Frei and Froeflich).

Thesis No. 3—We may take it for granted that in pharmacology it is generally accepted that Ehrlich's original thesis of direct parasitotropic action has been thoroughly discredited (Solis-Cohen). Unfortunately in practice it is by no means so evident. Quite early, to quote only a few, Uhlenhoth and Lesser doubted the direct action of Salvarsan. The Frankfurt Institute tried to prove direct action. The success with protozoal infections led to generalisations, which in practice had fateful results—namely the assumption that it was not merely a question of giving the largest possible dose, the dose is tolerated, but the fear that inadequate doses would make the organism 'arsenic fast'. The application of this principle to sanocrysin has had unfavourable results.

Walbum has stated it clearly regarding Ehrlich's fallacy:

'I have proved by any experiments on the therapeutic characteristics of metal salts, that this is based to a large extent upon completely erroneous foundation in respect to physiology of the process, and it may be considered as a definite fact that the injection of large doses of such compounds into an infected organism apart from the direct metal poisoning—to a great extent suppresses the natural defensive mechanism of the organism against the attack of the parasite, and by this fact alone improves the living conditions of the latter so that the individual will perish quicker than without treatment' .... 'It is particularly harmful in infectious diseases and it cannot be doubted that the deeper cause of this misunderstanding is due to the unlimited confidence in Ehrlich's theories concerning effective chemotherapy. It is readily comprehensible why it has taken so many years for this reaction to occur. It is due chiefly to the protective influence of the exceedingly great authority of Ehrlich, and, furthermore, to the lack of experimental evidence which could satisfactorily explain the phenomena of sterilisation magna in another manner.' (*Ztsch. f. Tuberk.* 48.193, 1927).

Ehrlich thought it essential that the parasite should be controlled by a single massive dose of the antiseptic. Clinical experience has shown this to be impossible and fortunately, unnecessary (Sollmann). Further, the compounds that are practically useful have relatively little action *in vitro;* they require the cooperation of the host (*loc. cit.*) and yet the same Sollmann seems to be got shaky on this point being led astray by Eagle's finding that neo-arsphenamines are active 1:200,000 and arsenoxide 1:1000000. This means nothing, nor can *in vitro* results be used as a finding principle. Neither the fact that Metaphen can kill *in vitro* staphylococci in $1:10^{-8}$ makes it an ideal internal antiseptic. It has still to be explained why at the height of a mercury cure by inunction in syphilis, the blood holds only 1·3 mg per litre whereas 20 mg per litre is not sufficient to retard the spirochetae *in vitro* (Lomholt and Kissmeyer). This also applies to Germanin, Salvarsan, quinine and bismuth.

It has been laid down that all anti-syphilitic drugs should conform to the accepted methods of Pearce and Brown for experimental rabbit syphilis. For lack of laboratory facilities, we cannot follow this method. Further, since Ehrilic's quantitative theory has been rejected and our dosage very small, we have proceeded to 'the final clinical tests must rest with clinical tests on man' (Sollmann). For 'the effectiveness of a substance cannot be determined infallibly through a test of healing in artificially infected animals and then upon man.' (Schlossberger).

Theses Nos. 4, 5, 6, 7—While the first three theses were based on the most recent and modern experiments, theses 4, 5, 6 and 7 are old Ayurvedic and Unani conceptions which have to be reinterpreted in modern terms and equivalents. Old authorities from Ayurvedic literature could not be accepted. In recent times a more sympathetic and less prejudiced attitude has been taken by some of our profession and attempts have been made to interpret old theories in modern terms by Lakshmi-

pathy, D. N. Banerjee, D. N. Ray, and the late Gananath Sen. We have sought to establish the similarity between the conclusions reached by old Ayurveds and the results of modern research which is once again slowly veering round to humoral pathology (Thannhauser). Historically, it may be asserted that the Ayurveds and Unanis were the first and earliest chemotherapeutists (Singhjee, P. C. Ray, Chopra). It can today be accepted that the so called 'purification' or calcining of metals aimed at the alteration of the molecular structure of the metal. In these days of colloids and ions, it is understandable, especially since it was shown at the Hamburg Institute of Tropical Diseases that caustic calcium of gold, though insoluble in water, was readily deposited in the liver, spleen and reticulo-endothelial system in experimental animals; Chopra and Sen showed the same for goldkustha, and the recent demonstration by Boyd of spectroscopic studies of metals in homoeopathic dilution, it is not improbable that a sympathetic but impartial study of old Ayurvedic conception of metal action may be a fruitful and beneficial field for a future National Indian Pharmacopoeia.

It may be said that while Ehrlich's conception of detoxication lay through complex organic arsenicals, the Ayurved and Unani approach lay through the *bhasmas* and *kushtas* modified through the action of herbal and animal tissue extracts. Thus experimentally it can be shown that arsenic toxicity is lowered by the addition of the juices of tribulus terrestris and Ashwagandha; mercury by the addition of mere traces of gold in calotsopis gigantia bark juice, and that the aim of all *bhasma* techniques is to convert them into detoxicated colloid forms. Sollmann states that the factors controlling arsphenamines toxicity is imperfectly known and that the arsphenamines tend to form colloidal solutions, a view completely in consonance with Ayurvedic conception of metal action.

Thesis No. 6—The term 'specificity' has in pharmacology and immunological studies been shown to be relative. So also has it been amply demonstrated today that most reactions are relatively specific and that there is no drug or drug compound which can cure all cases of any particular designation. The search for new anti-malarials, anti-syphilitics, the failure of the sulfonamides in a large range of cases and the resort to other methods of therapy imply that we can only assume that a given drug or compound covers a wide range of deviations of a certain disease category and can cure a good percentage of them. Thus quinine is suitable for only 26% of all malarias (Madaus) and it is futile to expect all cases of malaria to respond to it. Geshe has shown that corresponding to Falta's insulin—sensitive and resistant types, there are definite constitutions which are arsenic sensitive and mercury sensitive. We cannot agree with the suggestion that increased doses will accomplish that which small doses cannot (except in the case of the bacteriostats like penicillin). The continued increase of dosage of quinine and sulfonamide has had bad results. On the contrary, practical experience shows that any disease may require two or more drugs depending on the phase; thus quinine, atebrin, plasmochin as a cycle, or quinine and arsenic. The Ayurved and Unani Hakim has never worked in single drugs but in combinations determined through vast empirical experience. And, without prejudice, it may be stated that Chopra's method of approach to the question of action of indigenous drugs was fundamentally wrong and unfruitful.

Theses 6 and 7—Put briefly, Levaditi showed that metals, *viz.*, arsenic, bismuth and even quinine, are active only if tissue extract is added to them (liver, muscle extract). Kadish showed 1-2% bismuth solution to be ineffective. The addition of spleen extract gave it spirocidal activity. Addition of camphor monobrom to quinine increases the therapeutic activity of the latter, and I have shown that the addition of uranium nitrate and silver nitrate in minute traces increases the action still more; so also is the action on digitalis increased by addition of spiritus nitrosi dulcis. This is is in accord with Buergi's principle of synergism and oligodynamy. The Ayurvedic theory goes much further. It implies that a single basic metallic remedy or group may react therapeutically differently with different herbal or organic tissue extracts added to it. As a rough example we have personally proved the action of Makaradhwaja in the juice of betel leaf for beri-beri hearts, the same compound in the juice of *Jonisia Asoka* on amenorrhoea, and the same bhasma in the juice of *Occimum sanctum* (*tulsi*) in intestinal diseases. This thesis, in combination with thesis no. 7, that varying proportions of basic remedy groups in different combinations will give a wide range of indications, will, if proved for practical purposes tenable, constitute from the point of view of medical and national economics, a substantial step towards the problem of cheap therapy for rural areas. Only the practical experiment can decide these questions.

The Experimental Result

We therefore prepared empirically on the basis of these theses, a series of compounds in varying strengths and proportions, consisting of arsenic acid 1/3000—1/13000, mercury vivus 1/7000—1/1000, mercury perchloride, 1/10000—1/30000, antimony tartrate 1/1000, Bismuth 1/5000—1/10000 (Theses No. 1 & 2, Walbum, Kolmer). These were absorbed in bile and the fresh extract of liver and spleen, a method we have evolved for the past seven years (*ref.* Lavaditi, Kadish, Kritschevski, Lomholt etc.). These were again absorbed into a neutral substance like magnesium carb. To this were added fresh extracts of calotropis gigantia, argemone mexicana, Bhramadandi, ashwagandha and the extract of a plant which we have not been able to botanically classify but know in our parts as tellavara jammu. This last mentioned plant is used extensively by the poorer sections of the population annually which may explain the lower incidence of syphilis as compared to gonorrhoea. All these plants are known to be alteratives in syphilis in Ayurvedic experience.

Initial Results—Cultures made at a hospital for botulinus showed the substance to be bacterially free. Samples were sent out to our Bangalore centre and to a few voluntary workers. Our questionnaire emphasised the relationship between the skin and syphilis and whether it would work on skin lesions and pyodermias.

Clinical and as far as possible serlogical reports were requested. Great divergence of results between oral and parenteral administration was obtained, it was found that 2 grs. t.d.s. for over 8 days in some cases did not yield such dramatic results as a single c.c. of 0·9 per cent solution injection in 24-48 hours. This was defeating the purpose of our venture—namely, to evolve a simple and effective method of administration suitable for rural conditions.

We did not expect to hear that skin lesions would react well. It was surprising therefore to find that it had rapid action on skin lesions, old ulcers, several types of pyodermias and scabetic-form eruptions. Further, reports showed rapid drying of primary (Hunterian) and soft chancre (Ducrey's), so-called orient boils and fungating ulcers. Further surprising fact was that the samples with higher proportions of drugs showed severe reactions. In some cases myself and others reported fevers, sometimes with rigors, upto 105°F after which the eruptions started drying rapidly. In some cases of chronic arsenic-resistant syphilis very severe reactions occurred. Experiments now being conducted at one of the dispensaries tend to show that orally a powder 1/1000th the strength of the present test product is showing better results. Why that is so we do not know.

Not possessing laboratory facilities for serological tests, except Kahn, we must depend upon the cooperation of those people or institutions that have them. It has not been possible to obtain such cooperation except as personal favour. Most serological and research institutes in India possessing such facilities are Government-owned and military-controlled with rather reactionary, tapetied administrative and ideological outlook, and most of the research in India is also under old-fashioned bureaucratic control. We neither expect nor ask for cooperation from these quarters.

The present position is this:

623 cases of severe pyodermias of all categories of which 33 were proved ones for scabies were cured with subcutaneous injections of 0·9 per cent solution 1 c.c. varying from 1-3 at intervals of 3-9 days, in periods ranging from 2-4 weeks. Relapses were noticed in 67 cases in a period of 7 months. Severe reactions were noted in 52 cases in the shape of fevers which subsided in 24 hours with improvement of the lesions. 34 cases of primary chancre and 22 of soft chancre dried up after 2-3 injections. Of these the workers were able to follow up only six cases. 14 cases of secondary syphilis and 9 cases of old refractory tertiary and latent syphilis showed clinical improvement. Of these only seven could afford the Kahn test which is cheaper, only one a W.R., four were done free as a personal favour, and only one C. S. F. W.R. was done. Only two cases out of these showed a sero-negative cure, the rest only weakening of the reaction. One case of sternal gumma showed extraordinarily rapid response. 8 cases of asthma, refractory to other methods were reported cured. 7 cases of old psoriasis showed great improvement and of the 9 old syphilis cases, 4 were arsenic-resistant and arsenic-damaged previously and yet showed great clinical improvement after the 4th injection.

These results, far from conclusive, and though somewhat encouraging, lead to still bigger problems and questions which our Association is not in a position to and does not intend to solve, because it has neither the technical nor intellectual equipment to attempt them. The Association's sole task is, at present, to merely test out something overlooked, neglected or misunderstood, but which bears promise of utility, no matter where it comes from. The good we offer to those who can study it scientifically and improve it. The bad we scrap.

Thus the questions to be solved are:

1. Can this test product be made so effective so as to replace the arsphenamines and Mapharside?
2. If so, how soon can and should sero-negativity be achieved, how long will it last? In short what will be the time required to achieve complete sterility?
3. Why is the less than 1 per cent solution so effective as compared to much larger doses orally? What chemical and colloidal changes take place in solution? Does hydrolysis take place? If so does it alter or increase the therapeutic properties?
4. Why is the same solution in ampoule more effective and less painful than the fresh solution?
5. How can we make the oral administration more effective? How is it that a trituration of original powder to 1/1000 its strength is more effective orally than the original substance? To solve this problem is necessary because we must simplify the action of the drugs and their mode of administration.
6. How should the drug be modified in order to be more effective? Should they be split up into two with addition to each:
   (*a*) to convert one group chiefly into a powerful antisyphilitic?
   (*b*) the second group into the anti-pyodermic?

These are problems we are not in a position to solve by ourselves, and we ask all those better equipped both technically and intellectually to help us to carry the work further, if our little work is found worth supporting.

Conclusion

Attempts have been made on the basis of seven unorthodox hypotheses to build a cheap anti-syphilitic on behalf of the Rural Medical Research Association. The meagre results obtained have been of compulsion mainly clinical. They need further and more scientific study and assessment, controlled tests and serological and other confirmations for which co-operation is earnestly and humbly requested.

Our attitude is well defined by Solis-Cohen:

'The writer has avowed a "robust faith" in the efficiency of drugs wisely chosen and skilfully used (the right drug, given at the right time, in the right manner and for the right purpose to the right person). If he had no such faith, he would not have devoted time, thought and labour to this work.'

'But it must be admitted frankly that convincing proof of the apparent benefit of medication is oft times difficult, and many of the most important data on which proof might be based are as yet, obscure'.

'The course of wisdom seems to be neither the wholesale acceptance, nor the wholesale rejection, of the reported medicinal utilisation of the drug, but the critical examination and the evaluation of such reports in the light of pathologic and pharmacologic studies, and finally of clinical judgment—which last, fallible though it be, is all that we have to depend on. He that mistrusts it so much that he cannot accept its decisions, should not practise medicine'.

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SPECIAL ARTICLES

I

NEED OF SYMPATHETIC STUDY OF AYURVEDA BY MODERN MEDICAL MEN*

P. M. MEHTA, M.D. (BOM.),
Jamnagar

By an act of Providence, the Rulers of Jamnagar actively took up the cause of spreading the knowledge and use of Ayurvedic system of medicine on a scientific basis. Its first tangible fruit was the establishment of an Ayurvedic library and museum. As luck would have it, I was naturally closely connected with the organisation and as a wondering associate of an allied profession I was tempted to make the best of the opportunity thus presented to be introduced to the tenets of its venerated literature. As I probed deeper and deeper, I found that the subject had its own intrinsic merits along with the discrepancies shared by it, with other ancient Indian literature. With the progress of my study the panorama of the glory of our arts and sciences, their pros and cons, the ups and downs of the 3000 years of the historical period of Ayurveda began to slowly unfold itself before me in its natural colours and true perspective. My attachment increased and with the increase of the difficulties, intimacy began to develop. My knowledge of the present day medical science helped me very much to understand the interpretation of the Ayurvedic literature. I found many useful things in it and so I thought it my duty to place all these before the profession and induce the research-minded intellectuals and scholars to carry out a thorough examination of this subject.

As we all know the science of healing is coeval with the human creation. Its first gleanings, we gather from the Vedas, the earliest recorded knowledge on the earth. The Vedic period shows the society as already settled more or less on our own model. By the time of the epics this society had grown into a complicated form needing all sorts of artificial human aids. Ayurveda was, of course, one of them. It permeated thoroughly into the Aryan social structure that it got diffused and reached every remote corner of *Aryavarta*. We have no direct knowledge of any books on the period though we find some of them quoted by later writers. Later Maharsi Charaka called a conference of Vaidyas from all over the Country somewhere in the Himalayan region. There the conference collected, recorded, discussed and compiled all the existing knowledge of Ayurveda and founded a coherent system with a scientific terminology. A little later Maharsi Susruta did the same for the surgical knowledge. The medical science continued its glorious progress during the Buddhistic period. Vagbhata, Madhava, Sarangadhara and Bhavamisra kept up its steady progress on scientific lines until after 1550 A.D., when it began to stagnate owing to the deteriorating state of Indian political and social situation.

The period that followed this date is analogous to the dark age of the European civilization. In Europe the renaissance set in due course and gave the world

* Read at the Scientific Section of the XX All-India Medical Conference, Ahmedabad, December, 1943.

the modern scientific uplift. In India the awakening has already set in. The scientific spirit of modern medicine which is the basic principle of present civilization is the influence of the great movement of Renaissance. It influenced the medical science in many ways. First, by the revival of the Greek medical classics in the original which though these writers had imperfectly and in very inaccurate versions known before, was found to breathe a new spirit into medical learning. Next by the invention of printing which came at the right time to permit the original works to be widely distributed in the form of translations in all European Vernaculars which helped greatly to enhance the progress of the medical profession. But above all by the renewal of intellectual activity, the bold challenging of authority, the spirit of inquiry and research, which were the distinguishing marks of the new learning. One shall always remember the name of Francis Bacon, the first English thinker who had wide European influence, in the history of medicine, for recommending the physicians in his days to record, collect, arrange and tabulate data, drawing from them such generalization as they warrant.

We have been trained in this very spirit of research and enquiry and so it is but natural that we would first like to glance over the Ayurveda literature and the period when it flourished to know whether there were favourable circumstances for the development of scientific medical knowledge and for this purpose we shall examine the subject under two main headings.

A. Circumstantial Review of the Age when Ayurveda Flourished

1. *The condition of the country:*
   Land of plenty and fertility—self-sufficient.
   Peaceful environments.
   Support of the princes and the rich to education.
   Spirit of scientific research, inquiry, imagination, and thinking.
   Risis and Brahmans—the prototype of research scholars.
2. *The educational system and institutions:*
   Ideal of education in ancient India.
   Risi Kula, Guru Kula, Asrams anw Viharas as the centres of education like modern residential universities.
   Primary education, higher education and academic education.
   Universities: Names of most celebrated ones. The standard of admission and examination. Courses of study. Number and variety of students. Foreign students. Description of Nalanda University.
3. *Sanskrit Language:*
   Language of the educated. Parent language. Polished language. Rich language. Its structure. The phonetic alphabet. The grammatical word unit. The sentence—a real marvel of syntax. The Sutra style of its composition. The derivatives of its name.
4. *Development of other branches of science and general literature:*
   Subjects—Religion, philosophy, logic, language, politics and economics, medicine, astrology, mathematics, fine arts, useful arts, music, dancing, magic, erotic etc.
   Works and authors—Valmiki's Ramayana, Vyasa's Mahabharata, Gita, Kamsutra of Vatsayana, Arthasastra of Kautilya and Manusmriti.
5. *Development and progress of Medical Science.*
   The history of two thousand years.
   Story of Jivaka to illustrate the status of medical profession during that period.
   Classification in many branches and specialization in each subject. Type of specialists. Art of nursing. Hospitals. Missionary medical institutions. Veterinary science. Botany. Sexual science. Medical jurisprudence. Rules regarding public health and hygiene.

B. Review of Medical Science

1. *Two main classics.*
   Effect of courses of higher education on the academic education.
   Compilation of Charaka Samhita and Sushruta Samhita.
   Authors viewed as literary writers, as logicians, as practical workers, as philosophers, as moralists and disciplinarians and as scientists.
2. Comparision and contrast of the description of
   a. Inflammation in Ayurveda and modern medicine. Definition, causes, pathology, symptoms, diagnosis, treatment including operation and after treatment of wounds.
   b. Method of clinical examination.
3. *Present Status.* Causes of deterioration
4. *Awakening.* 1. New phase. 2. Pioneers and thier researches.
5. *Justification and revival.*
   1. Vast data. 2. Opinion of experts in both branches. 3. Economist's views. 4. Economic advantage. 5. Emergency lessons. 6. Sympathy and gratitude. 7. National culture.
6. *How to proceed.*
   1. Collecting and cataloguing of manuscripts. 2. Study of botany. 3. Founding of institutions. 4. Revival of Indian culture. 5. Vaidyas and doctors to combine together for research.
7. *Appeal and proposal.*
   1. Opinion of European scholars. 2. Team of research scholars to be appointed. 3. Two civilizations to be combined and made to work hand in hand. 4. Rigvedic exhortation.

(*Continued from col. 1, page 78*)

In children of the asthmatic stock if adenoids are present these must be removed to avoid asthma.

In conclusion I must say that want of histaminase in the body is of hereditary origin. Toxaemia is the chief underlying factor. Though it is true that the bronchial asthma can be brought about by a nasal reflex provoked by nasal or paranasal disease, only the nasal reflex is not capable of producing asthma. Its treatment should not only be medicinal but whenever a nasal or a paranasal abnormality is found it should be judiciously treated surgically. To treat bronchial asthma successfully, therefore, there should be a team work between the physician, the allergist and the rhinologist.

II

THE BRITISH GOVERNMENT WHITE PAPER ON A NATIONAL HEALTH SERVICE*

MAJOR R. S. SAXTON, R.A.M.C.

The following brief outline of the existing organisation of medicine in England is given:

GENERAL PRACTICE

There were two classes of patients:—

(*a*) Panel patients for whom the doctor received an annual sum per capita. These were workers below a certain income level who were compulsorily insured, and who could obtain medical advice and medicine free. The insurance did not provide for the dependants of the insured person, nor did it provide consultant advice, hospital treatment, laboratory or x-ray examinations, etc.

(*b*) Private patients, that is the rest of the population, other than paupers. These paid fees to private doctors.

This division of patients into two classes was a dangerous incentive to the establishment of two standards of treatment.

HOSPITALS

There were in general two types:

(*a*) Voluntary hospitals numbering 900 and having a total of 77,000 beds.

(*b*) Municipal hospitals numbering 140 and having a total of 70,000 beds.

The former were charitable organisations and included the best known teaching hospitals, having a fine tradition of service. However, they were financially unstable, and mostly inefficient units in that only 75 out of 900 had over 200 beds. Moreover being private institutions they could refuse to admit patients. The Municipal hospitals, owned and operated by the local authorities, were catching up with and overtaking the voluntary hospitals in every respect. They were large enough to be efficient allround units, and were obliged to take in any local residents requiring hospitalisation.

There was little or no co-operation between these two types of hospital.

PRELIMINARIES TO THE WHITE PAPER

During the early years of the war there was much discussion in the B.M.A. divisions on the question of the reorganisation of the Medical Services, and the results of the various suggestions put forward were summarised in a draft interim report circularised by the Medical Planning Commission of the B.M.A. in 1942. In February 1944, after many consultations with this Medical Planning Commission, the Government published its White Paper. The B.M.A. then arranged for the despatch to all doctors of a long questionnaire asking opinions on points of principle and detail in a reorganised Medical Service.

THE WHITE PAPER

The White Paper, as stated in its introduction, set out to "ensure that in future every man and woman and child can rely on getting all the advice and treatment and care which they may need in matters of personal health; that what they get shall be the best medical and other facilities available; that their getting these shall not depend on whether they can pay for them, or on any other factor irrelevant to the real need—the real need being to bring the country's full resources to bear upon reducing ill-health and promoting good health in all its citizens." This was to be achieved by the free provision for all who wished it, of:—a family doctor, consultants, hospital treatment, special clinics, midwifery, dental and ophthalmic treatment, drugs, and home nursing.

The Position of Doctors—The service was to be open to all who wished to enter it. There was to be no prohibition of private practice. The family doctor would work either in "Separate Practice" (*i.e.*, alone), being paid on a capitation fee basis; or in "Grouped Practice" (*i.e.*, a team of several practitioners), usually in Health Centres, being paid by salary. Consultants would work either full or part time at various hospitals, for salaries.

The Health Centre—This was envisaged as an institution to provide first-class premises and equipment for medical consultation and treatment, and minor surgery. It would have a laboratory and possibly an x-ray department and dispensary. Its staff would include nursing and secretarial personnel.

The Hospitals—These would have their work co-ordinated in one scheme. Voluntary hospitals would not be forced into the scheme. If they came in, they would be subsidised. and they would have to agree to certain minimum conditions for their employees, and submit to inspection by an inspectorate.

Clinics—A variety of special clinics: such as those for maternity and child welfare, T.B., cancer, V.D., etc., would be organised in conjunction with hospitals or health centres, whichever was most suitable in the locality concerned.

Administration.—Elected bodies, *i.e.*, Parliament and the Local Authorities, would control the scheme. The Minister of Health would be responsible to Parliament for the scheme as a whole, while the larger medical units, *i.e.*, the hospitals and dependant clinics etc., would be the responsibility of joint committees of the Local Authorities; and the smaller units of the service, *i.e.*, health centres and dependant clinics etc., would be the responsibility of the individual Local Authorities.

There would also be Health Services Councils, composed mainly of doctors, to advise the Minister and the Joint Local Authorities on the planning and working of the Service. And finally there would be a Central Medical Board with Local Committees to act as the employing agency for doctors in the Service.

Official B.M.A. Reaction to the Scheme—The B.M.A. objected to the democratic control of the Scheme and proposed alternatively a Medical Corporation free from popular control. They opposed any large scale development of Health Centres—an essential point in the whole structure of the new Service. They did not wish the scheme to be applicable to the

* Read before the Calcutta Branch of the I.M.A. on 5-7-45.

10 per cent richest members of the population. It should be noted that answers to the questionnaire by the medical profession did not endorse this attitude on the part of officials of the B.M.A. Of doctors replying, 68 per cent stated they would like to work in health centres and 60 per cent thought that 100 per cent of patients should be covered by the Service, while the replies from doctors in the Armed Forces (*i.e.*, most of the younger doctors) recorded 83 per cent and 70 per cent respectively in favour of these two essential points of the Service.

The Capitulation—In 1945, The Minister of Health dropped the White Paper and made alternative proposals to the B.M.A.: namely, a scheme based on a voluntary extension of the panel system to cover all the population. The joint Local Authority scheme for planning local services would be abandoned, and the hospital services would be co-ordinated by a committee representing equally voluntary hospitals and Local Authorities. Thus not only the principle of democratic control of the Health Services dropped, but the incentive to two standards of treatment was perpetuated. The tragedy was not only that business interests in the profession had triumphed over altruism, but that progress towards efficient co-ordination of a profession with increasing tendencies to specialisation had been indefinitely postponed.

The Last Word

It was still possible for the British public by strenuous agitation, both inside and outside parliament, to resurrect the White Paper, but the composition of the new Parliament would probably show whether the people would demand that doctors co-operate to maintain the people's health, or would allow them to compete for profit from the people's sickness.

(*Continued from foot of col. 2, page 91*)

All these precautions are very essential as the mortality rate in purpura following sulphonamide therapy is very great. 90% of these cases has been reported fatal. Only effective weapon against it particularly when it is thrombopenic is fresh blood. Nicotinic acid is of no avail. Vitamin B complex in large doses is sometimes of help.

Summary

A fatal case of purpura following sulphapyridine therapy has been related.

Cause of this condition has been discussed. Capillary defect and its cause explained in the light of hypersensitivity of an individual to a particular or many drugs of sulphonamide group.

In view of the high mortality rate in this condition every precaution should be taken to avoid a sensitive person and detect the condition early.

Acknowledgment

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CASE NOTE

A FATAL CASE OF PURPURA FOLLOWING SULPHAPYRIDINE THERAPY

NIRODE CHANDRA SEN, M.B. (CAL.),
AND
H. BISWAS, L.M.F.

Disergarh, Burdwan.

Acute purpura is an out-of-the-way complication in the treatment with sulphonamide group of drugs. The number of cases so far reported in the world literature is only nineteen. Having had the opportunity to observe it recently in a case of bronchopneumonia in a girl of 10 years, met in private practice, we like to record the case for the perusal of our fellow practitioners.

The patient was a girl of 10 years. She was one of twin sisters. She had been a chronic sufferer from malaria for sometime back. The spleen was enlarged, palpable three fingers below costal cartilage, firm in consistency but painless. The girl was slightly anæmic, but otherwise healthy. There was no history of sulphonamide group of drugs having been administered before.

Onset of Fever—Fever came suddenly with very slight rigor. It went upto 102·8°F under tongue. There was vomiting and purging with the onset of fever which subsided on the second day. There was slight cough when the fever started. During the next four days the fever was remittent and varied from 102° to 104°F. The cough increased along with this and the respiration rate was getting more and more hurried. She had 37 grains of quinine sulph with alkali mixture during these five days.

On the 6th day—Maximum temp. was 103·4°F. Pulse rate 140 per minute, respiration rate was 48 per minute. The patient looked pale. There was slight abdominal distension and she was constipated. Both sides of chest presented sibilant rhonchi all over. Diagnosis was bronchopneumonia. She was prescribed proseptasine one tablet six hourly along with alkalis.

7th day—Condition almost the same. Temp. varying between 102° and 103°F. Pulse rate was 160 per minute. Respiration rate went up to 56 per minute. B.P. was 100/60. Stimulants were given. Proseptasine four tablets daily continued.

8th day—Temp. almost the same. P/R—165/58. Urticarial rashes of various sizes appeared on the anterior abdominal wall, superior and inferior extremities. There was much itching along with these. Intravenous glucose 25%, 50 c.c. with calcium gluconate 10% 5 c.c. was given, ½ c.c. adrenaline was also administered subcutaneously.

9th day—General condition was almost the same. The rashes disappeared.

10th day—General condition almost the same. Proseptasine was replaced by Sulphapyridine One tablet six hourly.

11th day—General condition same.

12th day—The patient was feeling better although the temp. was still ranging between 100° and 102°F. Slight oedema of the eyelids was noticed. Urine was normal in quantity and there was no other complaint. Urine was examined for albumen with negative result.

13th day—Temp. almost constant. Respiration rate was coming down. There was diarrhoea. Bowel moved four times in the whole day.

14th day—Temp. varying from 99·4° to 101·4°F. Maximum respiration rate was 44 per minute. Bowel moved eight times. Diarrhoeic stool. Stool examination done.

15th day—Patient was afebrile in the morning but it rose to 101° towards the evening. Bowel moved twelve times, liquid stool. Purpuric rash appeared on the anterior abdominal wall. It did not disappear on pressure.

16th day—Temp. 98·4° in the morning, 101·2° in the evening. Bowel moved six times in the whole day. Purpuric rashes appeared over the face and extremities. There was œdema of feet and ankles. Urticarial rashes reappeared on the anterior abdominal wall with much itching. The patient looked very much pale. P/R. 100/36.

17th day—Patient afebrile all through the day. Purpuric rashes appearing in increasing number. Bowel moved four times in the whole day. Attempt to stop diarrhœa by bismuth osmokaolin mixture was done with little result. Lungs clear. Sulphapyridine was stopped.

18th day—Patient afebrile. Lips and face became œdematous. Oedema of feet and ankle increasing. It extended to the lower parts of both legs and was pitting on pressure. Bowel moved five times. The patient's pallor appeared to have increased. P/R. 104/36. B. P. 100/60.

19th day—Condition almost the same. Patient afebrile. She was feeling better, appetite was increased. but felt nausea after food.

20th day—Patient complained of severe pain in abdomen which was relieved on pressure and came at intervals. Often pain was followed by diarrhœic stool of a dark colour. The anterior abdominal wall felt very rigid at the time of pain. She also complained of severe pain in both the knee joints and the calf muscles. Purpuric rashes appeared on the soft palate and the buccal mucous membrane. Patient was very restless and anxious looking. She was thirsty and often complained of nausea. She passed urine once which was very dark. It was saved for examination. P/R 160/40. B. P. 88/54 mm. of Hg. Complete (as far as possible) blood examination was done. Cetrin and Kapilon was given intramuscularly. 100 c.c. of blood was given by closed method from the twin sister after direct matching. As she was very restless after that morphine was injected. The patient slept for two hours after that. She woke up only to pass a very dark coloured stool, which was saved for examination. She was more restless and complained visual hallucination. After about half an hour she complained of severe headache and burning sensations throughout the body. Death was almost abrupt.

Investigations—Full investigations could not be done as the case was seen in private practice but all

that could be done was possibly sufficient to arrive at a diagnosis.

Haematology—On the 6th day of fever—total W. B. C.—9500 per c.mm.; total R. B. C.—3,500,000 per c.mm., haemoglobin 10·06 Gm. per 100 c.c., colour index 0·9, polymorphs 82%, lymphocytes 16%, monocytes 2%.

On the 17th day of fever—total W.B.C. 4500 per c.mm., total R.B.C. 2,050,000 per c.mm., haemoglobin 7·6 Gm. per 100 c.c., colour index 0·8, polymorphs 62%, lymphocytes 32% and monocytes 6%.

On the 20th day of fever—total platelet count 99,500 per c.mm., bleeding time 24 minutes; coagulation time 16 minutes; capillary resistance test with tourniquet, capillary fragility present but not marked. The purpuric rashes were becoming prominent and bigger in size.

Urine examination reports—On the 6th day of fever—reaction alkaline, slight turbidity, albumen absent and a few leucocytes seen microscopically.

On the 12th day of fever—reaction alkaline, slight turbidity, albumen absent, a few leucocytes and no cast seen microscopically.

On the 20th day of fever—reaction neutral, very dark coloured, blood present, R.B.C. seen in large number, a few leucocytes but no cast seen.

Stool examination report—On the 14th day of fever—consistency liquid, reaction neutral, colour dark green, no ova, cyst, or parasite seen.

On the 20th day of fever—Stool was very dark coloured and occult blood test was positive.

It was unfortunate that we could not do a necropsy.

Diagnosis—As there was no symptom or sign in the lung at the time of death we can reasonably presume that the death was due to purpura following sulphapyridine therapy. Only necropsy could help us in coming to a final conclusion. But unfortunately it could not be done in our case. Hæmaturia, diarrhoea with colicky pains, and subsequent melæna could be explained in the light of hæmorrhage taking place in the kidneys and the intestinal wall. Pain in the knee joints and calf muscles could be explained as due to hæmorrhages in these parts. Terminal severe headache is explained in the same way.

Discussion

We are not yet on a sure ground as to the exact cause of purpura after sulphonamide medication. Agranulocytosis and aplastic anæmia are two well known complications caused by direct myelotoxic action of sulphonamide group of drugs on the blood-forming bone marrow. Platelets which are also formed there can be reasonably expected to suffer the same fate, and it was actually recorded in association of agranulocytosis and aplastic anaemia by Dolgopol and Hobart in 1939 and Meyer and Perlmutte in 1942. Scarborough (1943) records a case of thrombocytopenic purpura following local application of sulphathiazole ointment. In our case thrombocytopenia was really a dominant feature, although vascular element resulting from hypersensitivity from these drugs cannot be easily dispensed with.

In recent years the importance of the role of capillaries in the pathogenesis of purpura has been much stressed. (Mackay, 1931; Macfarlane, 1941; Scarborough, 1943.) It is said that purpura probably results from a generalised vascular defect. The defect is in the resistance of the capillary wall resulting in increased permeability and increased fragilty. This can well explain the cases of purpura where thrombopenia is not a prominent feature. This defect, *viz.*, increased fragility of the capillary wall has been noted in 8 cases of purpura following sulphonamide drugs. Now what is the cause of this defect? It is said to be some type of allergic reaction rather than simple toxic action of the accumulated drug. Rich discovered under microscope that the lesions were present in the vascular system which were like those seen in serum sickness in animals.

Chief manifestations of sulphonamide sensitivity are fever, rash and conjunctivitis. They appear more frequently during a second course of treatment than the first, and when they appear in the first they are seen not at the beginning but usually after the fifth day. The rash is variable in character. In many cases it is an erythematous macular eruption, in others it is an inflammatory exudative eruption on the face, arms, hands and legs. With sulphathiazole, lesion very similar to erythema nodosum may be seen. A patient thus sensitised may remain so even for five years and only a small dose of the drug may excite the reaction.

This allergic reaction led to the hypothesis that sulphonamides joined with a protein to form a haptene which sensitised the patient. There was already proof that sulphonamides form compounds *in vitro* with serum proteins, and Leftwichs (1944) in experiments designed to test the hypothesis has now demonstrated that there is present in the blood serum of patients who have received one of the sulphonamides for more than five days an antigen which will cause an allergic type of response after intradermal injection in sensitive individuals. Thus one step in the process of sensitisation seems adequately identified. Park (1944) has begun the next stage in the investigations into the mechanism of sensitivity. He has shown that some patients showing sensitivity give positive reaction with only one sulphonamide. Others give positive reactions with several sulphonamides and with sulphanilic acid, as the common radicle to all these compounds is $NH_2.C_6H_4SO_2$—he claims that this is the part of the molecule responsible for sensitivity. A third group reacts to procaine. which has the radical $NH_2.C_6H_4$—with no sulphonic group, and in these individuals the sensitivity is therefore less specific.

These experimental findings lead us to the following lessons: (1) No member of the sulphonamide group of drugs seems exempt as a causative agent. (2) This group of drugs should not be applied locally or given orally for more than a week, and if sulphathizole is given by mouth it is better that the course be limited to four days as it has a great tendency to cause a reaction. (3) Reactions are less likely to occur if the drug is applied in the form of thick paste or as watersoluble cream. (4) Always be on the look out to find a sensitive person before giving sulphonamide treatment. (5) Stop the sulphonamide drug whenever blood examination or physical examination reveals signs of purpura.

(Continued at top of Col. 2, page 89)

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CALCUTTA, DECEMBER, 1945

DRUG DISCOVERIES AND THEIR DISCOVERERS

Until the end of the 1st quarter of the 20th century, hardly, if any, advances were made in internal medicine so far as drug therapy was concerned. The last decade, however, has seen phenomenal progress in this direction. Pharmacologic research and the application of scientific methods in the study of the physiologic action of drugs are resulting in definite and positive contributions. Closely following on the discovery of 'Prontosil', modern chemotherapeutic investigations have resulted in the introduction of a number of sulpha drugs for specific therapy. D.D.T. and Penicillin next come into the scene, and if all reports regarding the new cholera vaccine are further substantiated, another epoch-making discovery would be recorded in the field of therapeutics within a reasonably short period. These are achievements unique in the history of medicine for over 3000 years.

In his article on 'Discovery of new drugs' included in the last issue, Dr. Mukerji points out that the present progress is due primarily to 'collaborative research' between chemists, pharmacologists and clinicians rather than 'individualistic research', which was in vogue up to the first quarter of this century. The examples of Germany, Great Britain and America, which Dr. Mukerji has cited, appear to lend very strong support to his contention. While we believe that individual capability, imagination and farsightedness are of value in making newer discoveries in any field, the complexity of drug research certainly calls for intensive special qualifications in several branches of science. A single individual, unless he is a genius, cannot possibly master the various aspects of chemistry, pharmacy, pharmacology, bacteriology and clinical medicine, often needed to throw light on such problems, and therefore, it stands to reason that the necessary knowledge must be pooled from sources where it is available. This is clearly seen in the development of the 'atom bomb'[1], which required joint investigation by almost all the brilliant scientists of Allied Nations. The same 'team work' is seen in the elaboration of Penicillin.

In spite of the tremendous difficulties and the technical knowledge necessary for the discovery of new drugs, it is surprising that so many claims for the cure or alleviation of conditions of such as tuberculosis, cancer, paralysis, leucoderma, insanity, sexual weakness, etc., are frequently paraded in the streets and published in the newspapers and medical journals? Have we really got so many discoverers of new drugs in our country? Or, are these the machinations of quacks and charlatans? Common sense automatically leads us to the latter conclusion. The wise physician knows that there are illnesses that drugs cannot cure, that drugs can only aid or relieve; that to obtain even this aid efficiently and safely, the existing scientific knowledge is none too great. The quack and the charlatan, however, see in disease only a 'name', to them a *name* is sufficient cure. It is sad that some physicians are misled by the sophistry of interested drug vendors, and prescribe such 'cure-all' remedies to their patients.

Physicians have the moral obligation to instruct the public in matters of health. It is their duty, therefore, to enquire when a 'new drug is claimed to be a cure', as to what are the qualifications of its discoverer. If such an enquiry is made, the physicians would find, in most cases, that the discoverer has assumed a self-assigned role of a great inventor and does not possess that long and careful training necessary for anybody to make a real discovery. He is just trying to discover a 'new name' and not a 'new drug'. No responsible physician, therefore, would be justified in advising his patients to take any such medicine.

We agree with Dr. Mukerji when he says that the lag in drug research in India is not due to lack of scientific talents available in India, but due to lack of research organisation. In an earlier editorial[2], we have supported the idea of the establishment of a National Institute for Drug Research, where chemistry, pharmacology, bacteriology and clinical medicine would be represented under the same roof and where work in close co-operation between the various types of scientists would be possible. If such an Institution could be brought into being, either by private charities or jointly by the commercial concerns, or by the State we believe that India could also make worth-while contributions in the field of drug research. Even without much support and without much laboratory facilities, Brahmachari discovered Urea Stibamine, which has saved hundreds of lives in Bengal and Assam. But such examples are rare. Discoveries of new drugs are only possible by systematic work carried out by and under the guidance of men who know their jobs, and who are free to give their whole time and energy to this direction. By adopting such policy, Germany succeeded and by following the same policy Great Britain and America are going ahead by leaps and bounds. There is no reason to think that India could achieve success through an easier and a much less tortuous path. More collaborative research in existing Institutions should be fostered pending the establishment of a well-equipped drug research Institute. The drug manufacturing firms are now happily alive to the needs of research on a wider scale and we may expect increasing support to such projects from this quarter. The inertia of the Universities and the existing State Research Institutions cannot be broken quickly and with the present policy of *laissez faire* that is being followed, prospects of forward move do not appear to be bright.

[1] H. M. Stationery Office—'Atom Bomb Research', 1945.

[2] Editorial—*J. Indian M. A.*. **14**:202-203, 1945.

CURRENT MEDICAL LITERATURE

Relation of Effort to attacks of Acute Myocardial Infarction

Blumgart (*J.A.M.A.*, **128**:775, 1945) reports 11 cases with acute myocardial infarction consequent to strenuous effort illustrating the relationship between the two. He further writes that the clinical criteria which must be satisfied to demonstrate this relationship are: (*a*) the development and increase of cardiac symptoms such as pain or substernal distress during or immediately following unusual effort, (*b*) continuation of the symptoms after cessation of effort, (*c*) presence of clinical signs and symptoms of acute myocardial infarction and (*d*) the development of characteristic electrocardiographic pattern of acute anterior, posterior or lateral wall myocardial infarction. The pathologic mechanisms which induce acute myocardial infarction during or soon after effort are: (*a*) subintimal hæmorrhages or the rupture of an atheromatous abscess following strenuous effort and (*b*) the occurrence of relative ischæmia brought about by strenuous effort and resulting in a need for increased blood flow which the arteriosclerotic vessels are unable to meet.

Unexplained Cardic Hypertrophy

Levy and Von Glahm (*Am. Heart. J.*, **28**:715, 1944 Ref. *Lancet*, **1**:634, 1945) report 10 cases of cardiac hypertrophy of unknown eitology with full necropsy evidence.

The ages of their patients ranged from 20 to 66, and 8 were males. In 8 death supervened within eight months of the onset of symptoms. The symptoms were those of myocardial insufficiency; in none was there any history of angina pectoris. Electrocardiograms were recorded in 7 cases, and all were abnormal; inversion of the T-wave, auricular fibrillation, paroxysmal tachycardia, auriculo-ventricular block and bundle-branch block being among the adnormalities noted. The blood-pressure was normal or subnormal. A striking clinical feature was the number of embolic phenomena; infarction of the lungs occurred six times, of the kidneys four times, of the spleen once, and of the central artery of the retina once. Post-mortem examination revealed hypertrophy of the myocardium in every case, but the cause still remained obscure. None of the hearts showed any abnormal degree of coronary sclerosis. In 4 of them some necrosis of the myocardium was found, associated occasionally with scarring which was put down to previous necrosis, but no reason for the necrosis could be discovered. Thrombi were seen in 6 of the hearts, but once again their origin was unexplained; the myocardium and endocradium underlying the thrombi were normal. The absence of infiltration of interstitial tissue with lymhocytes, monocytes, and plasma cells excludes the type of myocarditis of unknown origin to which Fiedler's name has been attached.

The authors are satisfied that these cases are neither syphilitic in origin nor yet due to any known vitamin deficiency. They may possibly be of heterogeneous origin, but the similarity of the clinical and pathological findings suggests a common aetiology. In elucidation of that aetiology, clinical and post-mortem records will be invaluable; but only, of course, if they are thorough and accurate.

Blood Pressure Variation and Cardiovascular Changes in Diabetes Mellitus

Chakravarti (*Indian M. Gaz.*, **80**:348, 1945) from the observations on the blood pressure variation and cardiovascular changes in 50 diabetic subjects treated in the Carmichael Hospital for Tropical Diseases, Calcutta, writes that hypertension and arteriosclerosis are of common occurrence in elderly diabetics; young patients usually manifest low pressures and with early and successful treatment they are likely to regain their normal tension.

Cardiac abnormalities are infrequent in diabetes.

Sequelae of Cerebrospinal Meningitis

Degen and others (*Brit. M. J.*, **2**:243, 1945) from a follow-up study of 986 cases of cerebrospinal meningitis (from the American Red Cross-Harvard Field Hospital Unit) mention the following as sequelæ of the disease: emotionally less stable; depression; inability to concentrate; poor memory; deafness—total and partial; visual disabilities —impaired vision, visual disturbances, enucleation of the eye, total blindness; strabismus; tinnitus; excessive lacrimation; apasia and slurred speech; pains in the limbs and rheumatism, weakness of limbs, lameness; poor balance; dizziness; gastro-intestinal complaints such as vomiting, poor appetite, persistent constipation and gastrointestinal pain.

It cannot be too strongly emphasized that these sequelae are not presented as disabilities caused by the meningitis, but only as symptomatic disabilities, persisting for more than three months, which first appeared or (if previously present) became accentuated immediately after the illness.

Arthritis Aphorisms

Comroe, writing from the arthritic clinic of the Hospital of Pennsylvania University, complains that doctors commonly treat their arthritic patients without first establishing the diagnosis, while others too often allow contractures to develop and pains to persist because they think only in terms of diagnosis. He urges that every patient with joint symptoms should have a complete history and physical examination, and the appropriate laboratory tests, but this does not mean that affected joints should not be splinted or mild analgesics given during the period of study. He goes on to extract a multitude of lessons from the experience at the clinic which may be summarised as follows:—

Do not depend too much on the sedimentation-rate in the diagnosis of joint disease. This test should be used in conjunction with common sense, a carefully taken history and a thorough physical examination, blood-count, urine analysis, serological test for syphilis, and x-ray films of the involved joint.

Do not tell the patient that the joint is normal merely because the x-ray findings are negative.

It is an error to diagnose gout frequently in females; 95-98 per cent of all gout occurs in males.

Other diseases besides local ones may cause pains and aches in joints and muscles.

Extensive hypertrophic changes in the spine may be found without symptoms.

People over 50 nearly all show x-ray signs of degenerative joint disease, usually symptomless.

Do not attribute pains low down in the back to arthritis merely because there are hypertrophic changes in the lumbar vertebrae or sacroiliac region. Backache is most commonly due to ligamentous and muscular strain. Chronic foot strain often causes pain not only in the foot and lower leg but also in the knee and low back.

Syphilis may mimic any form of joint disease.

Conjunctivitis and tenosynovitis are extremely commonly associated with gonorrhoeal arthritis.

There is no specific magic bullet for the treatment of rheumatoid arthritis—certainly not a gold one, and gold may be toxic.

Always remember you are treating a human being and not merely a few joints.

Do not tell the patient with rheumatoid arthritis to go to bed for a long period without proper exercise and massage; if he lies in bed like a lump of putty, much harm may be done.

Physical therapy alone will not cure most cases of arthritis.

It is easier to prevent a deformity than to correct one.

If you are a physician do not scorn to learn to apply plaster in your cases of arthritis.

Never manipulate joints that are acutely inflamed.

No particular form of vitamin deficiency has ever been shown to produce rheumatoid arthritis.

All bath-water is buoyant, whether it is in the patient's home or in a high-priced spa.

We do not yet know that role of focal infection in most cases of rheumatoid arthritis.

A protracted need for narcotics in a patient with joint symptoms sugests neoplasm.

Less than 10% of patients with rheumatoid arthritis who become pregnant are relieved of their rheumatoid arthritis for more than 4 to 6 weeks after delivery.

The injections of vaccines, sulphur, chaulmoogra oil, foreign proteins or the like will not straighten chronically deformed ankylosed joints.—*Lancet,* 1:569, 1945.

Mass Radiography in the Early Detection of Pulmonary Tuberculosis

The Medical Research Council has published a report on the results obtained by mass miniature radiography in the early detection of tuberculosis of the lungs. A survey of 23,000 persons from two factories, a large office group and a mental hospital, all in greater London, was conducted. Leaving out the mental hospital, because tuberculosis has long been known to show a higher incidence than the average in such institutions, interest centers on the early detection of disease among the general working population. The figures for the two factories and the office group were similar; between 1 and 1·5 per cent newly discovered tuberculous lesions. About a fourth of the persons affected were advised to leave work immediately for institutional treatment. The rest required outpatient observation while remaining at work. If the persons examined can be taken as a fair sample for the rest of the country, these figures mean an immediate temporary loss of 3 or 4 per thousand and some adjustment of work of 10 per thousand remaining under supervision. The final diagnosis was not made on a miniature film alone. About 6 per cent of perons were asked to return for a full size film and about 2·5 per cent for a medical interview—*J.A.M.A.* **128**:822, 1945.

Prolonged Administration of Mepacrine

Drew and Reid (*Lancet,* **2**:107, 1945) give in the following lines the summary of their observations on prolonged administration of mepacrine:

One hundred and two soldiers returning home after 8—36 months' service in West Africa have been investigated to determine whether any serious impairment in health resulted from their stay in this area of the tropics, and in particular if taking mepacrine had done them any harm. Mepacrine had been ordered for all men as a malarial suppressive for the last 4—18 months of their tour of duty.

Malignant tertian (*Plasmodium falciparum*) malaria was the most important disease encountered. Among these men there were no cerebral or other grave forms of the disease, no complications like blackwater fever, or serious sequelae of malaria like chronic splenomegaly and marked anæmia. This favourable state of affairs is almost certainly due in large measure to the antimalarial action of mepacrine.

Nine men had slight hepatic and splenic enlargement, and three others had palpable spleens, but these conditions were symptomless. The hippuric acid synthesis test indicated temporary impairment in liver function in nine men, three of whom had slight hepatic enlargement but this was of doubtful significance since other liver, function tests, including estimation of serum bilirubin, plasma proteins, and serum phosphatase, and the sucrose test, were all normal.

Liver-puncture biopsy of slightly enlarged livers showed that these had no deviation from the normal structure. There is no evidence that mepacrine in suppressive doses causes liver damage or other ill effects but there is good reason to believe that the drug has prevented deaths from severe forms of malaria and from complications like blackwater fever, and that its use can eliminate disability from chronic malaria.

Hypoprothrombinaemic Action of Quinine Sulphate.

Pirk and Engelberg (*J.A.M.A.,* **128**:1093, 1945) write that quinine sulphate induces hypoprothrombinæmia which can be prevented by concurrent administration of vitamin K. The concurrent administration of vitamin K to combatant troops receiving quinine has been suggested for the purpose of eliminating the danger of prolonged, prothrombinopenia-induced bleeding from wounds. The routine administration of vitamin K in conjunction with quinine given for curative treatment is also proposed.

Myotonia Congenita

Amirchand and Chhuttani (*Indian M. Gaz.,* **80**:380, 1945) report a case of myotonia congenita with eosinophilia and congenital nystagmus. The condition is believed to be unrecorded in India so far. The salient features of the disease are described.

Rat-Bite Fever Due to Cat-Bite

Swyer (*Brit. M. J.,* **2**:386, 1945) reports a case of so-called rat-bite fever following the bite of kitten. Some aberrant features are discussed, specially the occurrence of sever myositis, repeated relapse after arsenotherapy and apparent final cure by means of penicillin. The author makes a plea for the use of the term 'spirillosis' in preference to 'rat-bite fever' or 'cat-bite fever'.

Mass Sulphadiazine Prophylaxis of Respiratory Diseases in the U. S. Navy

Coburn (*Bull. New York Acad. Med.,* **21**:281, 1945) gives in the following lines the summary of his observation: Sulfadiazine prophysaxis has been administered to approximately 600,000 naval personnel and approximately 300,000 similar personnel have been observed as controls.

The institution of this measure was followed by a marked reduction in the morbidity rates for respiratory disease.

The incidence of respiratory symptoms observed at sick call was significantly lowered.

Hospital admissions for respiratory disease were reduced from rates varying between 5 and 18 per 1,000 per month to less than 1 per 1,000 per month.

Meningococcal infections were eliminated.

The incidence of pneumococcal penumonia was significantly lowered at most Naval stations.

Morbidity rates for respiratory diseases caused by filtrable viruses were unaffected.

The most effective dosage tested was 1·0 gram daily.

The administration of 0·5 gram of sulphadiazine daily was also found effective and was followed by fewer untoward reactions.

Mild, untoward drug reactions were observed in about 0·5 per cent. Severe reactions occurred in 0·01 per cent of men taking 1·0 gram of sulphadiazine daily. Sensitization of Naval personnel to sulphonamides and the development of sulphadiazine-fast respiratory pathogens did not occur.

Chronic Amoebic Dysentery: A New Approach to Treatment

Hargreaves (*Lancet*, **2**:68, 1945) writes that further trial of his method of dealing with chronic amœbic dysentery has produced execellent results. The method suggested by him is that the specific antiamœbic treatment is preceded by an attack on the secondarily infecting bacteria with penicillin and succinyl sulphathiazole (sulphasuxidine). These two drugs do not affect *Entamœba histolytica* but it is believed that they make severe refractory cases more amenable to treatment with drugs which have a specific action on the amœbae. To combat some of the organisms which are not sensitive to pencillin a course of sulphasuxidine is given concurrently by mouth. It has been fond repeatedly that there is rapid almost dramatic symptomatic relief, the diarrhœa and colic subsiding and general improvement taking place with this preliminary treatment with penicillin and sulphasuxidine. The standard specific treatment followed by the author consists of a 12 day course of EBI (grains 3, as an uncompressed powder in small gelatin catesules of one grain each) together with daily retention enemata of chinoform, followed by stovarsol or carbarsone grains 4 twice daily for 12 days. If the patient has dysenteric symptoms this course is preceded by 6 daily injections of emetine hydrochloride gr. i. The author interdicts the use of EBI in compressed pills or tablets coated with salol, keratin or stearin. The author further found that this treatment is effective in a few cases of ulcerative colitis. Illustrative cases are described.

The Treatment of Advanced Starvation

Magee (*J. A. M. A.*, **128**:822, 1945) at the Royal Society of Medicine opened a discussion on the treatment of advanced starvation, particularly on the use of protein hydrolysates. He worked for several years on the physiology of absorption and found that as fasting continues there is a progressive diminution in the absorptive powers and protective functions of the intestinal mucosa. The columnar epithelium is progressively disorganized, exposing the intestine to irritation by undigested foods with resultant diarrhœa. Parenteral feeding, by injection of amino acids to reconstruct the mucosa, is indicated. These should be used by the body as building materials but in starvation are apt to be broken down and used for energy. To protect them it is necessary to give glucose and B vitamins, which enable the body to metabolize glucose.

Dr. Hugh S. Stannus said that the conditions in starvation for which protein hydrolysate therapy had been introduced made a complex picture of many unknowns. If the patient could swallow, digest and absorb the requisite protein, this might be supplied in some suitable form, such as reconstituted dried skim milk powder by mouth or, if he could not swallow, by nasal tube feeding. But if he was unable to digest, protein hydrolysate should be given by mouth or by gavage and if he could not swallow, digest or absorb, resort must be made to intravenous administration. But this conception had been shaken by the case of a repatriated prisoner in the last stages of starvation who had difficulty in taking his milk diet. The case seemed to demand intravenous hydrolysates but none were available. He was therefore given glucose-saline intravenous therapy, a crude liver extract parenterally and teaspoon feeding with powdered liver extract. The response was dramatic, and the same result was obtained in another case.

Dr. Janet Vaughan, who was one of a small team sent out by the Medical Research Council to test the various methods of feeding in the Belsen camp, described the horrible conditions she found there. She first discussed intravenous therapy. Five patients were given amigen, which they took well, with no reaction. Four did well, but the fifth showed no improvement. The workers had no doubt that for intravenous theray serum was preferable to hydrolysates. The explanation was that with it there was much more protein and relatively little fluid.

Treatment of Plague with Sulphathiazole

Mathur and Goyal (*Indian M. Gaz.*, **80**:383, 1945) in reporting on the treatment with sulphathiazole of 81 cases of plague in a series of 120 cases in Karnal District in 1944 observe: (1) If the administration of the drug commenced on the first day of illness or immediately on the appearance of the bubo, and the drug was pushed in the prescribed dosage, the patient invariably became afebrile on the 3rd or 4th day, and the bubo gradually subsided in a week or 10 days. (2) If sulphathiazole was stopped at the intital improvement on the 3rd or 4th day, the pyrexia appeared again and the pain in the bubo reappeared with increased tenderness, when the drug had to be continued for a longer period, till the patient became afebrile again. In such cases the bubo invariably suppurated, and had to be incised. (3) The drug was of no avail in septicæmic cases, and all the 3 cases of this variety succumbed, in spite of every effort. The two hæmorrhagic cases, though severely toxic in the beginning, were cured under the treatment. Out of the 2 cases which developed secondary pneumoia, one recovered and the other died. (4) The drug should always be given with sodium bicarbonate, and in toxic cases soluseptasine and glucose should be given by the parenteral route. In cases with persistent nausea and vomiting, it is necessary to reduce the dose of the drug. (5) The case mortality among the 'treated' was 21 per cent. Even leaving aside the 11 inoculated were 16, giving a mortality rate of 23 per cent. On the other hand the total number of persons who did not receive cibazol treatment was 39 and among these 33 deaths occurred.

In most cases this drug was given in the form of 'cibazol' tablets. It was started with an initial dose of 2 grammes followed by a maintenance dose of 1 gramme every 4 hours, making a total of 7 grammes in the first 24 hours. On the

second and third days, the dose was reduced to 4 grammes, *i.e.* 1 gramme every 6 hours. This was further reduced to 3 grammes from 4th to 6th day, making a total of 24 grammes as the basic standard dose. Children of the ages 8 to 14 were given half the above dose, and in smaller children, the dosage was correspondingly reduced.

In patients with a tendency to nausea and vomiting, one tablet of nicotinic acid was given about 15 minutes before each dose of cibazol. For combating toxæmia, soluseptasine 10 per cent solution and glucose solution were administered daily by the parenteral route. For cardiac weakness, tincture of digitalis was added to the mixture, while coramine was administered whenever cardiac failure was apprehended.

A Possible Cure for DDT Poisoning

If this new insecticide is properly used, the danger to man is very remote. An account of DDT poisoning in man has been recently recorded; but it does not affect this conclusion. since the symptoms developed only after a deliberate exposure to DDT far in excess of anything that would be likely in practice. Nevertheless if DDT is to be as widely used in the future as we expect, it is not impossible that habitual carelessness on the part of an operator applying the insecticide in solution may result in intoxication. It is, therefore, useful to know of a remedy. Brazilian experiments suggest that calcium salts may be effective for treatment. The authors observed that the symptoms following administration of DDT are not unlike those of carbon tetrachloride poisoning. Since calcium had proved effective in preventing the effects of acute intoxication by carbon tetrachloride, it was tried for DDT. Dogs were given DDT (100 mg. per kg. body-weight) in olive oil daily, intense symptoms of poisoning were observed. It was found that intravenous injection of 20 c.cm. of 10% calcium gluconate effected recovery in 2-3 hours instead of the 12-24 hours necessary in the absence of treatment. Further-more injections of calcium gluconate for several days before DDT administration much reduced the severity of the intoxication. The dogs used in the experiments were alive and well a month after the experiments. *Lancet*, **1**:825, 1945.

Methylene Blue Test in Infectious Hepatitis

Gells and Stokes (*J.A.M.A.*, **128**:782, 1945) write that the modified methylene blue test for bilirubin in the urine employed in a study of infectious (epidemic) hepatitis with jaundice proved of value (*a*) in the early diagnosis of preicteric hepatitis (*b*) in evaluating the course of the disease and (*c*) in the prediction of impending relapse. Because of the simplicity of the test, it appears most useful in large scale testing during the course of an outbreak of infectious hepatitis and in installations where complete laboratory facilities are lacking.

The modified methylene blue test was preformed as follows. To 5 c.c. of a prebreakfast urine specimen were added 2 drops of an 0·2 per cent aqueous solution of methylene blue chloride. If a green color resulted, more emthylene blue was added dropwise and the last drop required to convert the green color to blue was recorded. Pipets were used which delivered 20 drops of the solution per cubic centimeter. Methylene blue chloride proved to be satisfactory in that the dye content of different lots showed little variation. When readings were made by natural light, no difficulty was found in determining the change from a green color to blue. If more than 5 drops were required to produce the color change, the urine was diluted with distilled water and methylene blue was again added drop by drop until the end point was reached. Correction was then made for the dilution factor. This was found to be necessary because the addition such intensity that the end point was difficult to determine.

Methylene blue tests on the prebreakfast urine specimens of 1,000 patients with diseases other than hepatitis give the following results: Seventy-four per cent of the urine specimens yielded a blue solution after the addition of 2 drops of the reagent. 24·3 per cent required 3 drops and 1·7 per cent required 4 drops in order to convert the resulting green color to blue. Thus in this series of 1,000 patients no urine specimens yielded a green reaction after the addition of 4 drops of the reagent. On the basis of the foregoing results a test of 5 drops or more was considered positive.

Changes in the Knee-Joint at various Ages

In view of the great variety of ætiological hypotheses of osteo-arthsitis many of which are unsupported by anatomical or laboratory evidence, Water Bauer, when the Commonwealth Fund placed him in charge of the Robert W. Lovett Memorial Foundation for the study of crippling diseases at the Massachusetts General Hospital, resolved to study the anatomy and physiology of normal joints. He and his colleagues have published a classic monograph on the changes in the knee-point at various ages. They obtained knee-joints from necropsies or following amputation from 63 individuals ranging in age from one month to 90 years, who, so far as was known, had no history or clinical evidence of articular disease. All the joints were removed unopened, while care was taken to secure the nutrient arteries; they were all x-rayed before further examination. They were then opened and studied both macroscopically and microscopically. The results of these investigations are beautifully recorded with no fewer than 28 plates in their monograph. It was found that all the joints obtained from individuals beyond the age of 15 exhibited changes like those observed in hypertrophic arthritis. The findings indicated that joints remained unimpaired for a very short time after complete development. The material, therefore, not only allowed the authors to achieve their original purpose of establishing the normal condition of the knee-joint at each age decade but enabled them to describe in detail the development of degenerative joint disease.

This condition first becomes manifest in the superficial layer of the articular cartilage in the second and third decennia. This tissue—smooth, glistening, translucent, resilient, and bluish-white in normal growing subjects—acquires a yellowish opaque colour and firm texture indicating a progressive loss of elasticity, while at the same time the surface layers exhibit small blisters, linear grooves, and pits in those areas where weight-bearing is concentrated. Miscroscopically there are slight irregularities in the surface from which fibrillated shreds of tissue have been detached; here the cells of the uppermost stratum are more numerous and form a dense layer with their long axes parallel to the joint lumen. The subjacent matrix has comparatively fewer cells, and the intercellular substance is swollen. Individual cells are voluminous and heaped in small clusters. Alterations in the calcified zone of cartilage may be an early or late accompaniment of changes taking place in the overlying hyaline layers. Early swelling, altered staining reaction, and, finally, loss of cartilaginous matrix accompanied by cellular necrosis and the absence of any evidence of inflammation show the process to be one of primary degeneration. Though the first changes appear in articular cartilage, parallel developments appear in other parts of the joint. Those occurring at the articular margin are perhaps the most evident; they consist

first of proliferating fibrous tissue, but with advancing years metaplastic fibrocartilage, hyaline cartilage, and bone develop. The cartilage-bone order, subchondral trabeculæ, and cancellous spaces of the joints studied showed manifold but no constant pathological changes. In individuals over 40 the calcified layer of cartilage increased in thickness due to calcium deposits in the hyaline zone, and when these were extensive the end-plate of the subchondral bone was irregular as the result of spotty ossification stimulated by and advancing into areas of abnormal calcification. Changes in the synovial memberane occurred late, usually after the sixth decade; villous structures hanging as threads from the synovial surfaces were the most obvious abnormality.

Bauer and his colleagues point out that there are two fundamental causes which are probably the predisposing factors in every example of degenerative joint disease. One is the paucity of the cellular constituents of articular cartilage, its remoteness from blood supply, low respiratory rate, and extremely limited faculty for autogenous repair. The other is the effect of mechanical stress and strain resulting from joint function upon a tissue whose specific means of resistance to such use has been depleted. The most constantly observed concomitant to the so-called primary degenerative joint disease is increasing age.—*Brit. M. J.*, **2**:290, 1945.

Aspiration Liver Biopsy

Sherlock (*Lancet*, **2**:307, 1945) believes that aspiration liver biopsy has a definite place in the elucidation of obscure hepatic diseases. The technique is described in detail with some indications of its use in diagnosis.

In every case, before biopsy is performed, the patient's blood-group should be known, and two pints of compatible blood should be readily available. Aspiration liver biopsy should not be performed unless adequate facilities for blood-transfusion are available in case of complicating hæmorrhage. A sedative is unnecessary before puncture.

The patient lies supine in bed with the right side as near the edge of the bed as possible. A firm pillow may be placed under the left side in the hollow of the bed, so that the body is slightly tilted to the right. The right arm is placed behind the head. A site is chosen in the ninth or tenth intercostal space in the middle or anterior axillary line. After cleansing, the skin is anæsthetised with 2% procaine solution. A long fine-bore needle is used to infiltrate the pleura and is then passed through the diaphragm to anæsthetise the peritoneum and the capsule of the liver. At least 10 ml. of local anæsthetic is needed. If the skin is tough ,a preliminary nick may then be made with a scalpel. the cannula used is 15 cm. long and 1 mm. in bore. It is fitted with a handled trocar. The instrument is passed through the skin, and the patient is then instructed to "take a deep breath in, let it out, and then hold the breath." This displaces the lung upwards and ensures apposition of diaphragmatic and costal pleura. The trocar and cannula are now pushed through the diaphragm into the right lobe of the liver. The trocar is not withdrawn until the instrument is fully half an inch inside the liver substance. The cylinder of liver tissue is then punched out by pushing the cannula on a further 4-5 cm. A 20-ml. 'Record' syringe is connected to the cannula, and suction is applied and maintained while the cannula is withdrawn. The puncture wound in the skin is sealed with collodion. The fragment of liver is usually found in the barrel of the syringe; occasionally it remains in the cannula. The aspiration of blood with the biopsy specimen need not occasion alarm.

As a little local pain may follow puncture, morphine gr. ¼ is given subcutaneously, according to the size and type of patient. This allays discomfort and prevents restlessness. If necessary, a further sedative, such as barbitone soluble gr. 10, may be given in the evening. The pulse is charted hourly for the first 24 hours after biopsy; the physician should be called if the pulse-rate shows a rise. Routine visits should be paid 4 and 8 hours after biopsy. A very careful watch must be kept on the patient, and if there is any sign of hæmorrhage the cross-matched blood should be administered. Absolute rest in bed is essential for 24 hours. The patient can then be up and about and if desired can leave hospital 8 hours after the liver puncture.

The procedure is attended with very little disturbance to the patient. During the puncture there may be a complaint of a drawing feeling across the epigastrium. Afterwards some patients have a slight ache in the right side for about 24 hours, and some complain of pain referred from the diaphragm to the right shoulder. Most patients agree that the discomfort compares favourable with that associated with sternal or lumbar puncture. Thirty patients had more than one biopsy; one had four.

There may be failure to get an adequate sample of liver. In our first 126 biopsies there were 10% of failures; in the next 138 only 2%. Difficulties arise most often in hepatic cirrhosis, especially if there is associated ascites. In cirrhosis the tough liver is difficult to pierce and few liver-cells may be extracted leaving the fibrous framework behind. In ascites the liver is very "ballottable" and is difficult to transfix. A paracentesis abdominis should be undertaken before the liver biopsy is attempted, and the patient should lie well over on the right side during the puncture. This brings the liver into contact with the chest wall. Another source of difficulty may be pulmonary emphysema; the liver is pushed downwards by the low diaphragm. It is very easy for the trocar to pass above the liver. If a low diaphragm is suspected before biopsy, the chest should be radiographed, and if necessary the puncture can be made through a lower intercostal space.

The fatality-rates in published cases are shown in a tabular form, the combined rate being 0·67%. In the first 126 punctures in this series there were two deaths, one of them in a patient already moribund with subacute necrosis of the liver. Since then a further 138 punctures have been performed with no evidence of hæmorrhage. This lessening of risk may be attributed to changes in technique and to more careful selection of cases.

Some information may be gained by inspection of the biopsy specimen. Fatty livers have a characteristic greasy look. Biopsy specimens of livers with excess fibrous tissue tend to crumble into fragments with a lobulated contour. If a malignant deposit has been punctured, the dull white appearance of the biopsy specimen is characteristic.

The most useful foutine fixative is absolute alcohol. Though it dissolves out red cells, it preserves the glycogen in the liver-cells and enables Best's carmine stain to be applied. To demonstrate the elements of blood in the hepatic sinusoids, formol-saline is the more satisfactory fixative. Fat can be shown by fixing the material in Bouin's solution followed by 2% osmic acid. After fixation the specimen is embedied, sectioned longitudinally along the line of the cylinder, and stained in the usual way. If desired, the sample can be examined bacteriologically.

An analysis of 264 biopsies is presented. Representative cases have been selected, and described to demonstrate the diagnostic use of the method.

Viability of Dysentery, Enteric and Cholera Organisms in Milk Curd (Dahi).

Panja and Ghosh (*Indian M. Gaz.*, **80**:390, 1945) give in the following lines the summary of their observations:—

Cholera vibrios are completely killed within 5 minutes by sweet as well as sour milk-curds (dahi). Typhoid bacilli are destroyed completely in one hour; in 20 out of 27 samples in 30 minutes, in 16 in 15 minutes and in a few within 5 to 10 minutes. Dysentery bacilli are most resistant but these are killed in 4 hours; in 17 out of 21 samples within 2 hours, in 12 within an hour but none within 15 minutes. Sweet and sour curds both behave in the same way with all these organisms, and lactic acid is the chief bactericidal agent.

Hydrochloric, acetic and citric acids possess poor bactericidal action on the dysentery and typhoid bacilli in comparison with lactic acid; they are highly and quickly bactericidal to *V. cholera* excepting citric acid which takes a longer time. Diluted fresh lime juice, pH 4·4, kills cholera vibrios in half an hour and undiluted lime juice within five minutes; it does not exert any bactericidal effect on *Bact. flexneri or Bact. typhosum.*

Retinal Changes in Diabetes

The retinal changes of diabetes consist of hæmorrhages and exudates, both confined to the macular area and rarely seen before the age of 35, and abnormalities in the calibre of the retinal veins. The hæmorrhages occur in the deeper layers of the retina, in loose tissue whose fibres run at right angles to the surface, and the areas of blood look roughly circular through the ophthalmoscope. They are quite unlike the hæmorrhages of hypertensive retinopathy, which are arterial and therefore arise in the nerve-fibre layer of the retina. Here the fibres run parallel to the surface and the hæmorrhages have a striate, brush or flame-shaped form. Unlike the cotton-wool patches of renal disease the exudates are firm and wax like with discrete margins. These changes are more often seen in mild than in severe diabetics, and most doctors agree that the control of the patient by diet or insulin has no influence is preventing their onset or causing their disappearance. Since they are confined to the macular area their effect on vision is very bad, and few such patients retain useful reading vision indefinitely. The condition is usually bilateral.

By examining unstained retina in bulk with the microscope Ballantyne (*Trans. Opthal. Soc. U.K.*, **63**:95, 1943, Ref. *Arch. Ophthal. N. Y.*, **33**:97, 1943) has done much to determine the exact histological nature and situation of the changes, and to correlate microscopic findings with funds appearances. The minimal pathological change, even in eyes which showed no ophthalmoscopic leaion, was the deposition of fatty droplets in the endothelial lining of the retinal capillaries near the macula. Where these droplets were most numerous they tended to obstruct the lumen of the vessel, which then formed a small ectasia or micro-aneurysm at this point. This micro-aneurysm in the macular area is the earliest retinal diabetic change seen with the ophthalmoscope, and hitherto it has been mistaken for a retinal hæmorrhage. The venous obstruction thus caused in turn gave rise to changes throughout the retinal venous system, varying from networks of newly formed vessels to gross beading and looping of the larger veins. Ballantyne concludes that some form of chemical agent in the blood-stream is responsible for the changes in the vessels, and that these changes may well be the starting-point of a pathological process which when fully developed presents the familiar picture of diabetic retinopathy.—*Lancet*, **2**:114, 1945.

Bacteriology of the Septic Hand

Williams and Miles (*J. Path. Bact.*, **57**:27, 1945. Ref. *Lancet*, **1**:634, 1945) write that septic infections of the hands are among the commonest and most serious septic wounds encountered in civil practice, yet less is known of their pathology than about major war injuries. The authors give us a useful bacteriological survey of 1197 wounds and septic lesions of the hand, and have classified their results according to the nature of the lesions. Of 432 lacerations of the hands examined within 6 hours of infliction staphylococcus aureus could be recovered from 21·1% while only 1·2% were contaminated with streptococcus pyogenes. The high incidence of staph. aureus in feesh cuts is probably closely related to the presence of these organisms on the hands and wrists of normal people; this is a point which could be settled by phage-typing the organisms from both sources. The organisms most often isolated from fresh cuts were micrococci (85·4%) but these are doubtful pathogens. The infection-rate, judged by the isolation of staph. aureus, among clinically healthy healing wounds which were never septic was nearly double that for fresh wounds; such "clean" healing wounds often showed as heavy an infection as frankly septic lesions. A large majority of septic lacerations and lesions yielded staph. aureus or strep. pyogenes—the former being much the commoner. In only three types of wound were streptococcal infections common: in suppurative tenosynovitis (27%), paronychia (65%) and septic major lacerations (45%). In all these lesions the initial infection is often staphylococcal, the streptococcus gaining entrance because the wound is open. Pulp-space abscesses on the other hand are usually effectively sealed off from the exterior and from secondary infection, and are consequently almost always pure staphylococcal infections. The association of streptococci with open wounds was confirmed in an examination of 54 wounds which were open and discharging at the time of sampling and in 34 closed abscesses which were sampled on first incision. Streptococci were found in 44·4% of the open wounds but in only 8·8% of the closed. This demonstration that in the septic hand streptococci are often secondary invaders suggests that this type of infection could be reduced by stricter surgical and nursing technique.

Lumbar Puncture in the Treatment of Penetrating Wounds of Brain

O'Connell (*Lancet*, **2**:389, 1945) gives in the following lines the summary of his observation: Indications for lumber cerebrospinal fluid drainage in the treatment of penetrating cerebral wounds are discussed.

Preoperative lumber puncture may facilitate debridement or the evacuation of an abscess, and may reduce operative trauma to the brain. Prostoperatively lumbar puncture may help to protect the scalp suture-line from tension.

It has proved valuable in ensuring drainage in the wound which becomes infected and breaks down after operation, or in the late untreated wound first seen with infection established.

It is the essential part of the treatment of progressive cerebral fungation.

It is of course useful for prophylactic or therapeutic administration of penicillin, and may also help in diagnosis.

Curare as an Aid to the Anethetist

Griffith (*Lancet*, **2**:74, 1945) notes that complete abdominal relaxation has hitherto only been obtainable by pushing a relatively toxic agent such as ether to a considerable depth or

a relatively non-toxic agent such as cyclopropane or pentothal to a profound depth. It is widely admitted that physiological damage is largely proportional to depth of anæsthesia. This has resulted in a great swing over to spinal anæsthesia in recent year. The relaxation thus obtained can be perfect, but entails the formidable responsibility of injecting "sterile" solutions with "aseptic" precautions into the most defenceless cavity in the body. Local anæesthesia moreover is usually short in duration, often imperfect, and always time-consuming.

In curare we have an agent capable of producing relaxation comparable with spinal methods in the presence of light anæsthesia, and ideal hitherto quite unattainable. The author is strongly of opinion that in no circumstances is "intocostrin' suitable for administration by other than the expert specialist. His experience to date convinces him that the drug is well worth extensive trial.

Testosterone Propionate in Mammary Cancer

Prudent (*Surg. Gynec. & Obstet.*, **80**:575, 1945) used testosterone proprionate as a postoperative measure in treating 63 patients with mammary cancer who had previously been operated on. As controls, 64 cases are reported in which the breast had been removed by the same technique of radical surgery and in which testosterone propionate was not used. All 127 cases were operable. The results obtained, as gaged by the survivals of three, four and five years, are about 100 per cent better than those observed after operation only. This fact indicates that testosterone propionate exercises a protective or prophylactic action against recurrences of surgically treated mammary cancer. Very high doses of testosterone propionate, up to 175 mg. a week, may and should be used after operations for mammary cancer, and this treatment should be continued through many years. The principal criterion for the selection of the dosage is the grade of histologic malignancy of the tumor. The side effects following this therapy are of secondary importance. They consist of virilization and of distrubances of menstruation. In patients between 40 and 50 years of age who are still menstruating, early cessation of menstruation is often observed.

The Urinary Complications of Pregnancy

Gabe (*J.A.M.A.*, **128**:1041, 1945) at a joint meeting of the Sections of Urology and of Obstetices and Gynæcology of the Royal Society of Medicine, opened a discussion on the urinary complications of pregnancy. He described the changes which occurred in the urinary tract during pregnancy. As early as the third month there were changes in the upper urinary tract. The anatomic changes most often seen were dilatation of the calices, pelvis and ureter as far down as the pelvic brim. The abdominal ureter was often elongated and might become tortuous, kinked and laterally displaced. Kinking usually affected the upper third of the ureter and there might be so much as to obstruct ureteral catheters. Even before the uterus was large enough to exert pressure certain physiologic changes atony, relaxation and stasis occurred. These were generally regarded as due to the action of hormone elaborated by the placenta. If the urine of pregnant women was injected into virgin rabbits, changes were produced in their urinary tracts like those observed in the pregnant animal. It had also been shown that the amount of the luteinzing principle and estrogen excreted in the urine increased during pregnancy.

The stasis and atony which occurred in the urinary tract were the perfect prerequisites for infection and it was remarkable that this did not more often happen. Stasis was found in 73 per cent of primiparas and in 45 per cent of multiparas. When excessive it might cause temporary renal impairment, but normally the total renal function was unaffected, and there were no changes in the blood chemistry. After normal pregnancy retrogressive changes occurred in 60 per cent of women within two weeks of delivery and intravenous pyelograms were usually normal by the tenth day of the puerperium. Ureteral atony might last for a fortnight or longer.

Miss Gladys Dodds discussed 287 cases of antepartum pyelitis admitted to University College Hospital. The average age was 25·4 years and 185 were primiparas. The infection occurred most commonly before the twenty-fifth week. The onset in the majority was sudden, with acute stabbing pain referred to one side, often associated with shivering, occasionally with frequency of micturition and less often with vomiting. The acute stage lasted on the average six days and then the general condition improved. In just over 10 per cent the course was more unfavorable, the temperature remaining high, the general condition not improving, and anæmia perhaps developing as a result of the prolonged sepsis Two patients died after the pregnancy terminated, 1 after spontaneous labor in the twenty-ninth week, the other nine days after hysterotomy at the twenty-third week. Necropsies showed in 1 case mild pyelonephritis and in the other pyelonephritis with the acute inflammation of the kidney pelvis and ureters.

The early patients, numbering 186, were treated with large doses of alkalis, occasionally with acids and methenamine. Only 4 so treated had sterile urine during the pregnancy. Another group of 37 were treated by a ketogenic diet or by mandelic acid. Five had sterile urine after treatment. A third group of 64 were treated with sulphonamides and in 36 the urine became sterile. Of the total number, 236 were subsequently delivered in a hospital of a viable fœtus. Signs of toxæmia developed in 73 before the end of pregnancy and 2 had eclampsia. The incidence of toxæmia was thus 30·9 per cent, which was lower than that of the normal clinic population.

Irreparable Vesico-Vaginal Fistuia in Iraq

Douglas (*Brit. M. J.*, **2**:78, 1945) reports 9 recoveries in a series of 11 cases of irreparable vesico-vaginal fistula by ureterocolostomy. The operative technique followed was that of Grey Turner with the following modification: Instead of incising the bowel to introduce the ureter the wall of the bowel is pierced with a cleft-palate needle carrying the anchoring suture. As the needle is pushed down the lumen for some two inches its broader shank dilated the hole in the bowel wall into which the ureter fits snugly. The anastomosis is made extraperitoneal, so far as possible by bringing a flap of posterior peritoneum over it. All cases are dealt with by a two-stage technique the interval being about a month. 2 patients died both from peritonitis, the remaining 9 patients returned to active life. Pyelitis was the commonest complication occurring in 5 out of 11 cases and appearing constantly between 8th and 14th post-operative days and evidenced by rise of temperature and pulse rate, pain in the loins, rigors and rectal frequency. Mild paralytic ileus was also common.

Treatment of Cervicitis

Finbley (*Am. J. Obst. & Gynec.*, **49**:614, 1945) reports his observations on 240 cases of chronic cervicitis treated by the three generally accepted methods of electrosurgery: actual or nasal tip cauterization, electrocoagulation and conization.

Microscopic studies were made before treatment and after healing was clinically complete. The average rates of healing were the same with all three methods. The percentage of satisfactory results was greatest after electrocoagulation, second after conization and least following cauterization. There was little difference between coagulation and conization in the terminal microscopic picture. Fibrous tissue reaction was low in both procedures, although slightly greater following cauterization. Complications most commonly encountered were hæmorrhage, stenosis and pyometra and were most frequently seen following conization. Hæmorrhage usually occurs from the tenth to the fifteenth day at the time of separation of the slough. Stenosis with resultant pyometra may be largely prevented by repeated dilation of the cervical canal. Carcinoma was discovered in 2 unsuspected cases out of 240 examined. Internal menstrual tampons were found to interfere with proper healing. Their use is to be condemned .

Hepatic Damage in Infantile Pellagra

Gillman and Gillman (*J.A.M.A.*, **129**:12, 1945) of Johannesburg, South Africa, give in the following lines the summary of their observations on hepatic damage in infantile pellagra:

By means of liver biopsies we have established that, on admission to the hospital the livers of infantile pellagrins show various degrees of fatty change; in severe case almost every liver cell is distended by a single large globule of fat. Liver biopsy is indispensible in establishing the prognosis and in assessing the effectiveness of any form of therapy.

The reactions of the liver to vitamins, liver extract and dried stomach have been studied in a selected series of 20 infantile pellagrins with comparable hepatic lesions on admission.

In severe cases the administration of vitamins intensified the accumulation of fat in the liver cells. Every one of the 7 cases treated with vitamins terminated fatally.

Although liver extract rich in the Cohn fraction is superior to vitamins, the fat is depleted from the liver slowly despite the clinical recovery. Only 2 of the 7 cases in this group ended fatally.

Dried stomach in 10 gm. doses daily in combination with hydrochloric acid leads to spectacular recovery of the patient and loss of œdema fluid. Moreover, the fat in the liver disappears rapidly and almost completely in every instance. All the patients treated with dried stomach recovered.

Although the fat content of the diet is low, there is a massive accumulation of fat in the liver, and it is excreted in large amounts in the fæces despite the emaciation of the rest of the body. It is suggested that, in infantile pellagra, carbohydrate is converted into fat which cannot be utilized.

We conclude that the administration of vitamins is severe nutritional œdema associated with pellagrous lesions in infants can be extremely dangerous and is contraindicated.

On the basis of the results obtained in our carefully selected cases, dried stomach is the most valuable theraeutic agent available for the treatment of severe infantile pellagra. Since dried stomach causes the rapid depletion of fat from the liver, it must be regarded as a vigorous lipotrope.

In children discharged as clinically cured, liver biopsy has revealed the existence of residual liver damage, the extent of which is determined by the severity of the initial lesion and the nature of the therapy.

Recurrent attacks of subclinical and overt malnutrition result in progressive hepatic damage. These repeated insults are in no small measure responsible for cirrhosis and probably for primary carcinoma of the liver so frequently encountered in young Negroes in South Africa.

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NOTES & NEWS

LUCKNOW UNIVERSITY (AMENDMENT) BILL SHELVED

The U. P. Governor has decided not to proceed with the Lucknow University (Amendment) Bill, 1945, which was published for inviting public opinion, says a press note issued by Government. It will be left for consideration by the future Government.

The proposed Bill, it will be recalled, was opposed by the Lucknow University Court and the University Executive Council and also by the Central Committee of the All India Medical Association. A number of prominent public leaders of the province had also expressed their strong opposition to it—*Pioneer.*

MEDICAL EDUCATION IN BENGAL:

Interviewed regarding the report issued to the press of the Expert Committee about the upgrading of medical schools in Bengal, Dr. K. S. Ray, who was a member of this committee, said that the Committee was unanimous in their recommendation that the school types of medical education should be put an end to in Bengal as soon as possible. This policy has already been given effect to in most of the other provinces in India by converting schools into colleges by suitable State aid.

According to the Government Committee's estimate a sum of about Rs. 15 lacs capital expenditure would be necessary to convert the National Medical Institute into a college. The public has also a duty in the matter. There is no reason why Government should not come to aid as a post-war measure, so as to give some practical proof of it in action. We do not yet know what the Bhore Committee has to say regarding the fate of the existing medical schools both official and non-official and as to the need of the future requirements regarding the number of medical colleges. It is high time the public is taken into confidence by making its recommendations available to the public.

The province of Bengal also had Post-War Reconstruction Committee on various problems and I had the privilege to serve in some of them, but we do not know yet what happened to their recommendations and how far they are going to be accepted by the Government. Past exeprience does not inspire much hope about committees and commissions' recommendations, they usually find restful places and nourishment—*Calcutta M. Gaz.*

GOVERNMENT OF INDIA'S PUBLIC HEALTH SCHEMES

Doctors to assist the Government of India's public health schemes and teachers who will implement education programme will be arriving in England next year for advanced training, has said Mr. Kirpal, Asistant Educational Adviser attached to the High Commissioner's Office in London in the course of an interview.

These scholars, all post-graduates, will follow the 150 technological scholars expected to arrive here before the end of the year.

The "scholars are to undertake special technical and social training in this country as part of Government of India's post-war development scheme," Mr. Kirpal stated. "Universities and technical colleges throughout the United Kingdom have given me every assistance to place these scholars and although they had considerable difficulties to overcome, they have managed to find accommodation for the 150 new-comers."

COMBATING EPIDEMICS

British health and military authorities have completed preparation to combat what was described by a high Government spokesman as the "danger of an epidemic resulting in a catastrophe such as the human race has not known", writes Reuter's commentator on international affairs.

Penicillin and "M. and B." supplies have been concentrated at strategic centres in Britain and, where possible in Europe. Mobile medical units are standing by prepared to be rushed to any danger point theatened by epidemics. Rutheless and drastic measures are contemplated to isolate zones of infection and take every possible preventive action.

This, it is felt in Government quarters, is the only hope of avoiding one or more epidemics this winter, which would dwarf the death-roll of the two waves of influenza in 1918, when 31,640,000 people died in nine months. For, if a similar epidemic breaks out and is not isolated, the capacity to resist will be considerably lower in Europe than it was at the end of the last war.

The danger as seen from London, is that medical control is not centralized and that British health authorities do not know what is going on, for example in refugee camps in the Russian zone in Austria. In view of the highest authorities here, the problem is so grave that soon it may overshadow all political difference and call for energetic and total collaboration among all the nations to defeat the threatening menace to the future of mankind.

So far, however, it seems that efforts for concerted world-wide counter epidemic plans have not yet materialized.

AMERICAN HOSPITALS IN BENGAL

The Bengal Government have agreed to purchase the full equipment and stores of four of the seven American hospitals now in the province. One of these hospitals is at Lalmonirhat and the other three are situated in the districts of Burdwan, Bankura and Midnapur.

The U.S. authorities proposed to hand over the equipment of the fifth hospital near Dacca to an American missionary society working in Bengal. The remaining two hospitals are still being used by the Americans, but the Government have already entered into negotiations with them regarding the purchase of the equipment of these institutions.

The Government are considering whether the equipment and stores purchased by them will be used for supplementing the existing supplies or whether the hospitals will be retained in their present sites.

Mr. J. L. Llewelyn, Secretary, Health and Local Self-Government, told a reporter of the *Statesman* that the Government would make every effort to ensure that all medical supplies and equipment in Bengal which the American authorities did not require for their own use, were acquired for use in the province.

The Government Health Department has also a scheme for using a portion of the American hospital in the Dhakuria Lake area as a children's hospital for Calcutta and the neighbourhood. The proposed hospital will have 500 beds—*Calcutta M. Gaz.*

PROGRESS OF SOVIET MEDICINE

Henry E. Sigerist, M.D., Professor and Director of the Institute of the History of Medicine, Johns Hopkins University, Editor, *"American Review of Soviet Medicine", writes:*

The accomplishments of Soviet medicine have just begun to be revealed and it is no exaggeration, to say that the experience of glimpsing these achievements and visualizing what they can mean to world medicine and health protection is being seized upon with enthusiasm. Dr. Alan Gregg, Medical Director of the Rockefeller Foundation, at the first anniversary meeting of the American Soviet Medical Society in November, 1944, defined the Soviet medical advance as "one of effloresence and nascence, and not one of renascence; of cultural, intellectual and scientific plethora, the like of which has never been known before."

The methods used in Soviet medicine's social approach to health protection and the accomplishments stemming from its approach in research and wartime surgical and medical practice have aroused a great interest. Specifically, the greatest interest has ben aroused by the blood bank system, the successful epidemic control, gas gangrene vaccine, Bogmolet's old-age serum, Filatov's work in trans-planatation of tissues, Frumkin's reconstruction of wounded genitalia and Negovosky's revival work. It goes without saying that the splendid record of the Soviet medical corps during the war has made a profound impression. The sum of this newly circulating knowledge is the recognition, among growing number of foreign medical men.

Colonel Elliott C. Cutler, formerly Professor of Surgery at Harvard University, and Chief Consulting Surgeon of the European Theatre of Operations, reported after his visit to Russia in 1943, "With devotion to the ordinary private soldier as the key-stone of Russian military idelogy, the Red Army hospitals evidence a capacity for that we have not thought of, but we should have though of it. The process by which Russian wounded are sorted so as to get the best care is better than ours. Giving a man who has lived in a trench a hot-bath is A_1 medicine and the Russians have cashed in on it..... Russian care of the lightly wounded is excellent, proved by a record of 76 per cent of men restored to service."

Dr. Charles Richard Drew, Negro Physician and Professor at Howard University in Washington, D.C., who was awarded the Spingarn Medal for 1943 for his work on blood plasma and who prepared the first plasma to be shipped from the United States to Europe for transfusion purposes, says, "To the Russian investigators must go the credit for supplying the early work, most of the fundamental knowledge, and the impetus which has to a large degree been responsible for the widespread creation of the blood and plasma banks."

Dr. Cabot, stating that the Russians lead the world in the treatment of battle casualties and in prevention methods to forestall warbred epidemics, said, "What I want to know is how they have been so successful and whether their methods can be adapted by ourselves for our own benefit." Dr. Cabot has been one of the most spirited advocates of exchange of physicians between the two countries for study and investigation.

Dr. Wilder Penfield, Professor of Neurology and Neurosurgery at McGill University, Montreal, Canada, said after his return from Russia as a representative of the Allied Medical Mission, "Soviet surgery is well organized, efficient and modern. Their methods of blood collecting, and the preparation of blood derivatives and the distribution of these preparations may well be considered the best in the world. Psychoneurosis or shell-shock is really rare in Russia for they have an enormous supply of its specific antidote. This antidote is high morale and an enthusiasm generated in adversity."

Dr. Tracy J. Putnam, Professor of Neurology at Columbia University and Director of Services of Neurology at Neurological Institute, says "In the fields of neurology and neurosurgery, great strides have been made by the scientists of the Soviet Union, and neurologists of the Soviet Union, and neurologists in this country look forward to a broader exchange of ideas and students with their Russian colleagues.

Dr. Kingsbury has reported, "The U.S.S.R. Commissariat of Health caring for 170,000,000 people is the greatest and only one of its kind. No one can deny that in the short period of a quarter century Soviet medicine has stood the test. All that has been accomplished so far in 5,000 years of medical progress represents but the first epoch, that pertaining to curative medicine. Now we are at the beginnig of a new epoch, that of preventive medicine begun in the Soviet Union."

Many physicians have remarked on the large proportion of women amoung Russian doctors. In this connection, Dr. Cabot says, "There is to my mind, no rational explanation of the relatively small proportion of women in the practice of medicine in English-speaking countries. I suspect that it has been importantly influenced by habit, custom and prejudice, and I suggest for your consideration the question of whether or not in the advancement of modern medicine in this country, in the days to come, we cannot profit by the examble of our Russian allies."

Dr. Penfield says of his visit to Russia, "Aside from medical and surgical information and their excellent organization, the thing that made the deepest impression on us, perhaps, was the role of the Russian women."

These are samples of the appreciation of American physicians for the magnificent record of our Russian Colleagues. It is an appreciation founded on solid accomplishment and it cannot help but continue to grow. From this growing knowledge and co-operation, in turn, will inevitably come immeasurable benefits for our people—*U.S.O.W.I.*